조경학석사 학위논문

Cognitive Mapping with Local Residents in Search of Resources for Sustainable Ecotourism

-With a Focus on Villages Located around Upo Wetland Protection Area-

지속가능한 생태관광을 위한 지역커뮤니티 이해관계 분석

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환경조경학과

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이 논문을 조경학석사 학위논문으로 제출함

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위 논문은 서울대학교 및 환경대학원 환경조경학과 학위논문 관련 규정에 의거하여 심사위원의 지도과정을 충실히 이수하였음을 확인합니다.

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ABSTRACT

Today, minimizing environmental impact while promoting resident participation in cultural district, environmental history and natural environment wisely is called ecotourism. Ecotourism was introduced as an alternative of existing public tourism, however, majority of ecotourist attractions(ETA) failed to operate and manage effectively due to top-down governance and continuous conflict with the local residents.

Ministry of Environment have designated 20 ETA since 2013, unfortunately, the reality of the sustainable management is not well activated. Designated ETA not only have been polluted, it also have potential to get polluted in near future, and get constant complaints from local residents. Also, based on various researches on sustainable management of ecotourism, have pointed out lack of local residents' participation and suggested increasing local residents' participation in the process of management planning and operating management.

Upo wetland of Changnyeong-gun, Gyeongsangnam-do Province in Korea is one of the ten ETA that has been designated as wetland protection area and Ramsar wetland. Even though precious ecological value has been proved, the wetland has only been focused on conservation with strict regulations, which caused conflicts with the local residents. Therefore, for setting sustainable management of ecotourism, local residents' participation is desperately needed.

The purpose of this research is to reconstruct land use zoning for sustainable ecotourism of Upo wetland with local residents' participation. Also, to establish spatial planning for entire operation and sustainable management. Adjacent the wetland and the villages as ETA by setting the upper stream area of Upo wetland such as Daedae, Kwandong, Hyojeong and Soya village as research site is essential.

The research method is divided into two steps. First, mapping cognition of the local residents of the research site, then generated the combined cognitive maps and analyzed how the local

residents feel about the environment of their area. Cognitive map was set through open interviews with the local residents in advance, then proceed the mapping with generated items. To reconstruct sustainable ecotourism of Upo wetland, cognitive map and existing land use zoning was compared. Based on the local residents' interview responses, ecotourism program has been suggested. Geographic Information System(Arc GIS 10.1) was used during the process of reconstructing mapping and land use zoning.

Using cognitive mapping in this research supported comparative analysis of reconstructed land use zoning and existing land use zoning. As a result, local residents' participation highly affected reconstruction of land use zoning. The contents are listed as follows.

1. Balancing realistic regional economy activities and conservation of nature.
2. Grasping the specific reasons and improvements of environmental damage.
3. Discovering ecotourism resources and potential resources though local residents' voluntary participation.
4. Increasing willingness of local residents' program participation.

This research examined the effect of local residents' participation. As a conclusion, ecotourism with the local residents is more practical. Nonetheless, other areas should establish more participation of local residents for improved operating management plan. Government ministry, local government, and other related organizations need to pursue sustainable ecotourism with local residents. With high expectation, it is anticipated that ecotourism provides both conservation of nature and regional economy activities.

Keyword : Place attachment, spatial cognition, community participation, wise use, land use zoning, mutual relation, community mapping, ecotourism, sustainability, Upo wetland

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Chapter 2: Theoretical Study

Chapter 3: Cognitive Mapping and Overlapping Analysis

Chapter 4: Plan for Sustainable Ecotourism

List of Abbreviations

APG	Agriculture Promoted Zone
AAZ	Agricultural Activity Zone
AWA	Area with Attraction
AWV	Area with Vulnerability
C	Conservation
CM	Community
CMZ	Conservation Management Zone
ESZ	Eco-Sensitive Zone
ETA	Eco-Tourist Attraction
GIS	Geographic Information System
I	Interpretation
MAB	Man and the Biosphere
MSZ	Mutual Support Zone
NEZ	Nature Exploring Zone
PA	Potential Area
PLMZ	Planned Management Zone
PMZ	Production Management Zone
RSZ	Rural Settlement Zone
TIES	The International Ecotourism Society
UNESCO	United Nations Educational Scientific and Cultural Organization
WPA	Wetland Protection Area
GDI	Gyeungsang-namdo Development Institute

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Chapter 1: Introduction

1.1. Background and Purpose of Research

1.1.1. Background

There has been increasing demand for harmonization of nature and humanity as the nature is being exposed to increasing number of population and lifespan, urbanization and mass production of necessities for living along with development of science and technology. The concept of ecotourism is known worldwide for its contribution to wellness of both society and nature by providing opportunities to experience the natural environment and indigenous culture while securing the quality of natural environment and regional economies with involvement of various stakeholders. Great amount of researches related to ecotourism have been published and it is proved that resident participation is one of the key factors to activate sustainable ecotourism(Korea Environment Institute, 2011).

However, in South Korea despite of support of governance for vitalizing ecotourism along with increasing numbers of protection area. There are only few ecotourism sites that secure the quality of natural environment and regional economies simultaneously with active resident participation. Numerous researchers insist that the limitations of ecotourism in Korea is the result of the combination of regional environmental analysis[1], application of conceptual approach, top-down governance and most importantly lacking participation of residents in decision making and management process(Ministry of Environment, 2002; Kim, S. I., 2003; Eom, B. H., 2004; Kim, J., 2011; Lee, J. H., 2016).

Today, there are 20 approved ecotourism destinations[2] in Korea. Upo wetland is

1) Non-site specific environmental analysis

known to be the largest fresh water wetland, selected as the first generation of Korean ecotourism destinations and recognized for its great ecological value[3] for providing habitats for countless number of winter migratory birds with its unique landscape. In addition, settlement of human beings along with ongoing agricultural and aquacultural activities around the wetland for centuries.

Despite its fame, Upo wetland is a great example of typical Korean ecotourism designation with the limitations mentioned above. The specific type[4] of the wetland performs dynamic fluctuation of water level during the wet season, which is influenced by surrounding surface, water entering the wetland through four main streams(Koo, B. H., 2009)[5]. The streams are interconnected with surrounding communities where various forms of human activities occur all year round. Today it is proved that the wetland quality have been degraded by mass production of agriculture, releasing non-point and point source pollution into the wetland through four main streams (Ministry of Environment, 2002; Nakdong River Basin Environmental Office, 2011). Furthermore, majority of the communities around the wetland perceived policies and management related to conservation and functionality of the ecotourism negatively (Gyeongsangnamdo Development Institute(GDI), 2007).

Various plans and researches have been proposed to resolve existing problems

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2) 20 Ecotourism Destinations of Korea approved by Ministry of Environment : DMZ of Yanggu-gun, Kangwon-do province; Wangpicheon of Uljin-gun, Gyeongsangbuk-do province; Dragon Swamp of Inje-gun, Kangwon-do province Euryale ferox wetland of Gangneung-si, Kangwon-do province and 16 other ecotourism destinations including Upowetland www.eco-tour.kr [Accessed on 2016. 12. 24]

3) Upo wetland is registered and designated as Ecological Landscape Protected Area(1997), Ramsar Wetland(1998), Wetland Protection Area(1999), East Asian-Australasian Flyway(2007), Natural reserve(2011),

4) Approved to be either Oxbow lakes, marshes(Ramsar, 1998) or back marsh(Ministry of Environment, 2010).

5) Topyeung Stream, Chogok Stream, Daehap Stream, Pyungji Stream

related to conservation of Upo wetland and sustainable livelihood of the communities. Although, the information used for environmental analysis are outdated or limited to specific sites due to lack of monitoring. Furthermore, humanities and social analysis were rather focused on monuments, numbers of occupation, population within multiple counties than identifying limiting factors of the specific villages with hydrological connections to the wetland and perceptions of the villagers toward surrounding environment in diverse ways to activate resident participation.

Upper Topyeung stream, the largest stream entering Upo wetland is suspected to be the greatest threat to the wetland condition as the stream is exposed to large number of villages, livestock farms and the field with most production of garlic and onion (Nakdong River Basin Environmental Office, 2011). Nevertheless, the existing plans proposed by various national institutions and researchers for upper Topyeung stream only suggest conceptual approaches to directional properties of ecotourism or conservation with riskiness, limitations or probabilities of the solutions. Such plans suggest the needs for improvement of resident participation, prevention of water contamination, restoration of the reclaimed farmland, usage of farm waterway for recreation and many other approaches.

Majority of pre-existing plans have not been taken in action and opinions of residents are overlooked in the processes of identifying specific sites for applying solution or when suggesting programs which are potentially unviable due to lack of resident participation. To propose viable plan for harmonizing wellness of both nature and human, the spatial and situational perception of the local residents towards the environment need to be strategically considered along with environmental and humanities and social analysis as human activities are unconventional which may potentially remain, threat or improve the surrounding environment depending on complexities of individuals' needs and concerns.

1.1.2. Purpose of the study

The purpose of this study is to propose sustainable ecotourism plan with identification of natural and cultural resources for ecotourism attraction and environmentally vulnerable areas in the communities that are hydrologically and culturally connected to Upo wetland with application of cognitive map.

There are four goals to be achieved in this study. First goal is to search areas that have or had natural and cultural attachment to the local residents which could be developed for ecotourism attraction as an alternative way of sustaining livelihood of the communities.

Second goal is to identify the areas of high vulnerabilities that are exposed to non-point or point source pollution and utilizable areas that could be used for improvement of the environment.

Third goal is to propose suitable zonations and programs that could combine findings of first and second goals by overlapping cognitive map with the environmental map created based on literature review and public geographic information system data with an application of the concepts of ecotourism.

Fourth goal is to revive the villagers to find resources in nature with an application of cognitive mapping which will improve awareness of the residents to activate sustainability of the community.

1.2. Scope of Research

1.2.1. Conceptual approach

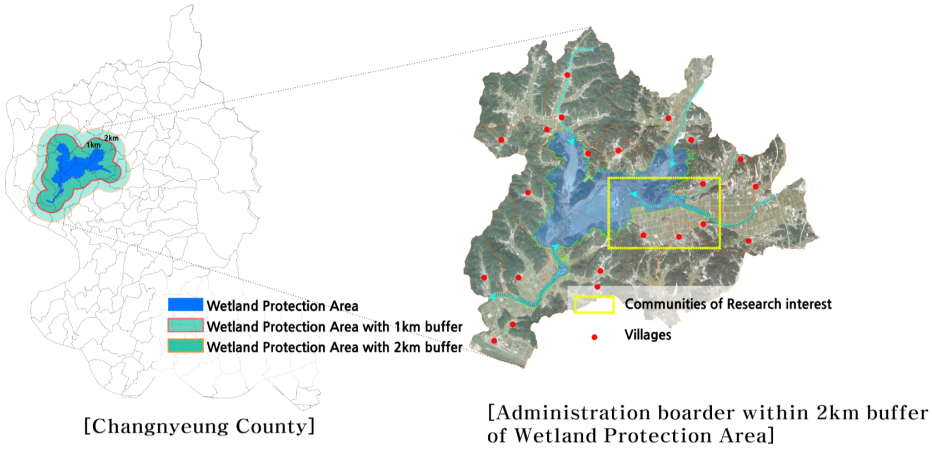
This research is focused on identifying areas for ecotourism planning to tackle existing problems between residents'livlihood and conservation issues within wetland communities. The problems have been ongoing since Ministry of Environment unilaterally designated Upo wetland as 'Natural Ecosystem Conservation Area'(1997) followed by 'Wetland Protection Area'(1999) where most of local residents were receiving necessities for living from the wetland until then. Currently, there are 22 villages within 2km buffer of the wetland protection area and the behaviors of land-use have shifted over time from small fisheries, organic barley cultivation and pastured livestock to mass production in agriculture and various industrial factories resulting in degradation of the wetland environment. Coexistence of increasing recognition of ecological value of Upo wetland and the shifting behavior of land-use resulted in complex problems.

Such complex problems are usually difficult to clarify but exposed to local residents' daily life. In this study, the spatial and situational perceptions of the residents toward surrounding environment including mountains, streams, wetland and other living environments are analyzed with an application of cognitive mapping to clarify and resolve problems related to wetland management and land-use plans within the communities surrounding Upo wetland.

1.2.2. Spatial approach

Upo wetland is a inland wetland located in Changnyeong-gun City, Korea. As Upo wetland is in forms of oxbow and marsh type of wetland, it is maintained by the surface water and stream year round. The wetland has total surface area of

2.31km²which consists of four sub-wetlands which are hydrologically related to each other and known to be Upo 1.29km², Sajipo 0.36km², Mokpo 0.53km² and Jjokjibul 0.14km². There are four main streams sustaining the surface water level of Upo wetland. Topyeung stream is the largest stream out of the 4 streams with a length of 29.5km and an area of 120.2km²(Kim , J. W., 2011). The research sites include upper Topyeung stream and the surrounding communities within 2km²buffer of current wetland protection area. As the site include boundary of the wetland protection area unilateral conservation activities are taken on one side and living environment is formed on the other side. Therefore, the research site has a great ecological value and at the same time the site is exposed to various forms of human activities causing non-point and point source pollution. There are total of four villages in the site which are 'Daedae Village', Kwandong Village', 'Soya Village' and 'Hyojung Village'.The perceptions of 5 villagers from each villages towards surrounding environment including farmland, stream, levee, forest and residential area are to be analyzed.

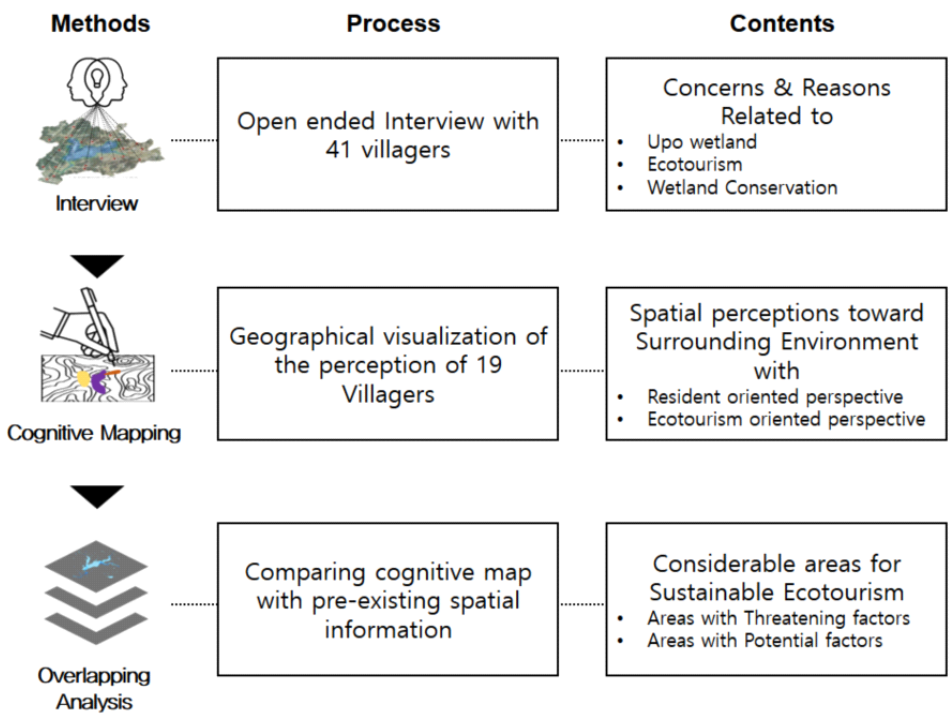


[Figure 1-1] Spatial approach of the research

1.3. Research Method and Flow

1.3.1. Research method

The research method is focused on identifying natural and cultural resources for naturally attractive areas and environmentally vulnerable areas within the communities adjacent to upper Topyeung stream for sustainable ecotourism planning. This research paper applies various methods which consist of interview, cognitive mapping and overlapping analysis for verifying threatening and potential factors within the site based on spatial and situational perceptions of the residents as shown in [Figure 1-2].



To conduct a cognitive mapping in order to geographically visualize the cognition of villagers, it is necessary to understand general issues perceived by the residents within the communities. In this study one on one interview was conducted with 41 villagers from 20 different villages to see how local residents generally perceive current conservation activities, ecotourism and Upo wetland itself. The contents derived from each interview were examined and the specific contents including concerns and reasons mentioned by majority of the interviewees were classified into 'positive', 'negative' and 'living environment' groups to construct mapping items.

With the mapping items derived from the interview 19 villagers from 4 different villages located in research site were asked to participate in cognitive mapping. The participants were assisted by the researcher to understand geographic feature of the base map to freely draw their ranges of cognition regarding mapping items. Then collections of geographically visualized individuals' cognitions were digitalized and overlapped. The digitalized cognitive maps are reclassified based on ecotourism oriented perspective, which are groups of 'Areas with attraction', 'Areas with vulnerability' and 'Potential areas for community involvement'.

The reclassified cognitive maps are overlapped with pre-existing spatial information proposed by various researchers to prove differences made by an application of the cognition of the residents towards surrounding environment. After the overlapping analysis considerable areas with threatening factors and potential factors are referred for sustainable ecotourism planning.

1.3.2. Research flow

[Table 1-5] Research Flow

Chapter	The Contents	Methods
Chapter 1	Research Background and Purpose Research Scope and Purpose Study on Previous Researches	
Chapter 2	Overview of Upo Wetland ·Importance of Topyeung Stream and the Basic Background) ·Pre-existing Solutions Current Status and Challenges of Ecotourism in Korea Importance of Cognitive Map for the Research	Literature Review
Chapter 3 **Cognitive mapping and overlapping analysis**	Cognitions of the Villagers Toward Surrounding Environment Process and Result of Cognitive Mapping in Search of Considerable Areas for Ecotourism Demonstration of the Differences Between Cognitive Map and Pre-existing Spatial Information	Interview Cognitive Mapping Overlapping Analysis
Chapter 4 **Planning**	Zoning for Ecotourism Utilization and Management of the Areas of Interest Differences Made by Application of Cognitive Mapping in Comparison with Pre-existing Spatial Plans	

1.4. Previous Research

1.4.1. Trend of Previous Research

This research is focused on proposing an alternative ecotourism plan with the opportunities for conservation and wise use of the resources within Upo wetland which are based on spatial understanding of existing problems and inappropriate land-use behavior discovered by application of community mapping. Prior to conduct this research, trend of researches related to 'Ecotourism with an involvement of local community' and 'Upo wetland' was studied.

1.4.1.1. Trend of Ecotourism Research with a Focus on Local Community Participation

Nowadays in Korea, there are great amount of researches about Ecotourism focused on diverse subjects such as analysis of attractiveness of ecotourism resources, ecotourism strategies with sustainable development perspectives, various research on awareness and behavior of ecotourists (Lee, J. H., 2016). Since the concept of ecotourism was officially introduced in Korea for the first time in early 90s, the number of researches on ecotourism gradually increased. In the early period, most ecotourism related researches were focused on concept, principles and characteristics throughout the case investigation researches from counturies with advanced ecotourism. Followed by researches on analyzing tendency of ecotourism, residents' awareness towards ecotourism, potential of specific areas for ecotourism development and establishment of strategies (Cho, J. H., 2014). As Ministry of Environment and Ministry of Culture, Sports and Tourism designated 10 Korean ecotourism sites in 2010, large number of researches on development of indices, programs and policies with a focus on specific ecotourism sites in Korea were introduced (Ahn K. H.,

2009; Kang, M. H. et al., 2010; Lee, J. H. et al., 2012; Ryu, J. S. et al., 2012; Lee , S. Y. et al., 2014).

Ahn, D. M.(1998) conducted a survey on human activities and ecosystem with an involvement of local residents, ecosystem profession and environment education instructor to develop ecotourism plan. At the end of the research Ahn, D. M., (1998) concluded that resident participation is crucial when planning and managing ecotourism sites. Yoon, H. Y.(2008) conducted research to discover priorities for consideration when developing ecotourism at mountain villages with an involvement of local residents. Yoon, H. Y.(2008) implemented a survey to identify the local residents' awareness toward ecotourism and their willingness to participate which concluded that education for residents and participation of various stake holders are crucial when planning ecotourism. Yang, S. P.(2012) conducted research to analyze the relation of local residents' behavior, awareness and willingness to participate towards ecotourism development. The analysis was implemented in a survey format, which consisted of variables of sustainability, economic reliability, local patriotism, perceived benefits, support level for development and willingness to participate which concluded that for sound development of ecotourism. It is necessary for residents to recognize how ecotourism contributes to local community positively. Additionally, the synergy of local residents and participation will result in formation of virtuous cycle system of sustainable development of both tourism and communities. Lee, J. H. et al. (2015) used Q methodology to analyze the behavior and subjectivities of diverse stake holders of community operated ecotourism sites, which concluded that 'Education and program' and 'governance' related to ecotourism have a strong effect on local residents' behavior. As there are more opportunities for local residents to participate in managing ecotourism site the intention to involvement increases.

1.4.1.2. Trend of Researches on Upo Wetland

Most of researches on Upo wetland are about environment·ecology, conservation·management and ecotourism. Researches related to environment·ecology are mostly focused on hydrology (Lee, E. Y. et al., 2005; Kim, T. G. et al., 2007; Kim et al.,2008; Boo, M. H. et al., 2008; Lee, J. J., 2009; Yoon et al, 2010) followed by vegetation (Oh, 2004; Kang, 2007; Kim, 2007; Kang, 2009; Ahn, 2009; Ahn, 2011). Researches related to ecotourism are mostly focused on awareness of ecotourists (Lee, 2000; Cho, 2006; Yang, 2010; Lee, 2012; Jung, 2013) followed by ecotourism resources(Roh, 2005; Ryu, 2012).

Lee, G. W. et al.(2000) conducted research to analyze characteristics of visitors during summer season throughout the survey, which concluded that the motivations for visiting the area were natural landscape, vegetations of the wetland and education for children in ascending order. Cho, S. H. et al., (2006) insisted that the visitors' motivation to visit Upo wetland was to enjoy natural environment, experience ecology of the wetland and rest in nature.

Based on a survey by Roh, Y. H., (2005), cognition of communities around the wetland towards specific villages where economical benefits are concentrated, concluded that most of the residents were negative about the phenomenon and willing to participate in ecotourism. Additionally, even though the residents had awareness towards conservation of the wetland, most residents did not clearly understand why the boundaries of wetland protection area were set. Lee, E. Y. et al.(2005) proposed a conservation and management plan for Upo wetland within wetland protection area, which included restoration and wise use of the wetland in order to provide habitats for flora, fauna and ecotourism opportunities for visitors and residents. Additionally, Lee, E. Y. et al., (2005) proposed strategies for mitigating existing problems in the community. Kim et al., (2007) verified disappearing

wetlands and proposed a conservation management. According to Kim, T. G., et al., (2007), Upo wetland and other wetlands are exposed to the contamination caused by ungovernmentally friendly agricultural activities. The survey conducted by Kim, J. (2007) proved that majority of the residents tended to victimize themselves due to lack of communication with government officer. Lim, K. U.(2013) insisted that the residents of Upo wetland had positive awareness toward sustainable tourism development as the residents were demanding more occupations and improvement of local economy.

1.4.2. The Importance of Research

1.4.2.1. Lessons from researches

Previous Researches related to Upo wetland pointed out that even though the wetland is registered as wetland protection area, the wetland and the water system are still exposed to various forms of pollution which require comprehensive management and planning considering both environment and residents. The visitors and residents were positive towards conservation of Upo wetland however, both visitors and residents were not fully satisfied as visitors demanded broader range of experiences and the local residents have lack of understanding of the management and plans for conservation. As a conclution, fundamental concept of ecotourism is yet established when looking at current ecotourism of Upo wetland therefore current zonation, facilities and the management need to be reconstructed.

1.4.2.2. Specialty of the Research

Previous researches on ecotourism and community involvement in Korea have pointed out the importance of education for the communities and active community

participation, which were the results derived mostly from text based surveys.

Previous researches on Upo wetland have pointed out that neither environment conservation nor ecotourism of Upo wetland are fully functioning and most of environmental analysis were implemented through Geographic Information System (GIS) within regional scale. Some were analyzed through actual inspection but only within wetland protection area which could result limited factors. Furthermore, text based surveys about awareness towards ecotourism of Upo wetland were conducted with visitors, residents of typical villages,or villages that are not geographically related to Upo wetland.

This research differs from previous researches as it conduct interviews and mapping as methods of understanding, identifying and geographically representing existing problems recognized by the local residents within the communities that are hydrologically connected with Upo wetland. Throughout the interview with local residents, the research issues are identified and classified as a process for selecting mapping items for Community Mapping. Community Mapping with the mapping items derived from the interview allows building connections between environmental issues and local residents'awareness of environmental issues by geographically visualizing (Community Mapping) actual problems on a map which is compatible with the format; the way environmental issues are expressed with analytical perspective. The data provided by the participation of local residents will be fundamental and essential information when planning ecotourism.

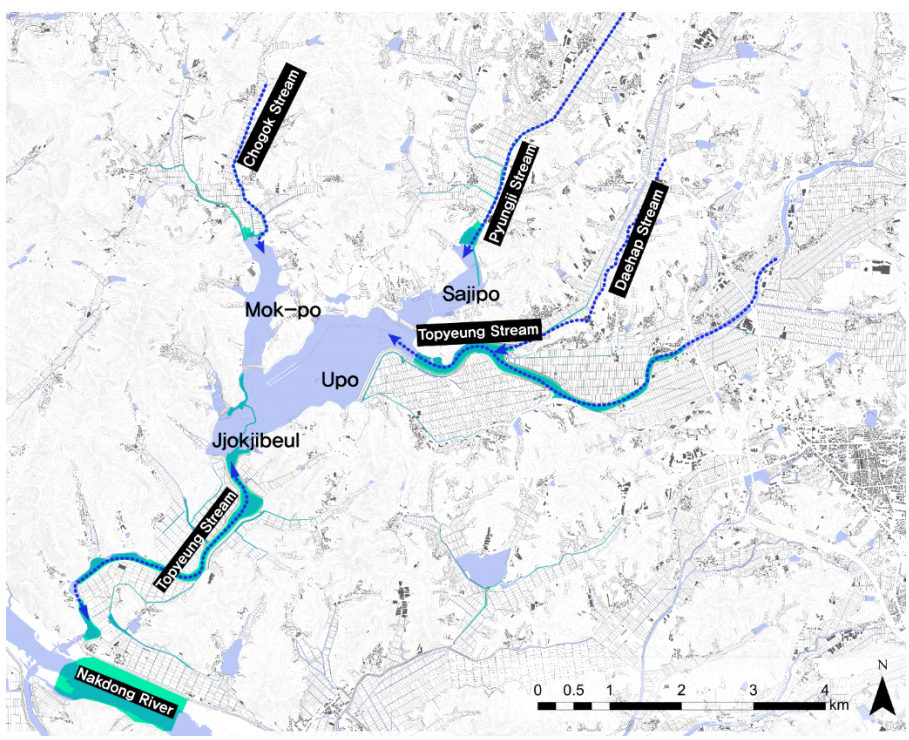
Chapter 2: Theoretical Study

2.1. Upo Wetland

2.1.1. Upo Wetland

2.1.1.1. Environmental Status

Upo wetland is the largest fresh water wetland in Korean peninsula with total surface area of 2.31km²(Kim, J. W., 2011). The wetland is a part of Topyeung stream watershed which is connected to Nakdong river. The wetland consists of 4 sub-wetland that are 'Upo', 'Mokpo', 'Sajipo' and Jjokjibeol sustained by multiple streams(Kim, J. W., 2011) as shown in [Figure 2-1].



[Table 2-1] shows that the sub-wetlands are known to be either large oxbow lake, marshes(Ramsar, 1998) or fresh water wetland and back marsh (Ministry of Environment, 2010), which are types of wetland that are mostly likely to get influenced by surrounding surface water or the streams (Kim, J. W., 2011; Koo, B. H., 2009).

[Table 2-1] Sub-wetlands of Upo wetland

Sub-wetlands	Area (km^2)	Wetland Type(Ramsar)	Wetland Type (Ministry of Env.)	Characteristics
Upo	1.29	Large oxbow lake/ Marshes	Back marsh	1. High biodiversity 2. Maintained by surface water or the stream permanently
Mokpo	0.53	Large oxbow lake/ Marshes	Fresh water Lake wetland	
Sajipo	0.36	Large oxbow lake/ Marshes	Reservoir wetland	
Jjokjibul	0.14	Large oxbow lake/ Marshes	Back marsh	

Since the elevation of Upo wetland is at least 5 meters lower than surrounding topography, the water from surrounding areas naturally flows into the wetland (Koo, 2009). Therefore the surface water is persistent even during the dry season (Ramsar, 1997). Topyeung stream is known to be the main stream having a major effect on a wetland environment due to its size and hydrological characteristics shown in [Table 2-2]. The Topyeung Stream flows from Mt. Yulwang(662.5m) which merges with tributaries from Mt. Wangryung(252.6m) and Mt. Guryong(207.6m) through Upo wetland, then enters Nakdong river but during the rainy season over flooding of Nakdong river causes counterflow[6], which results in dynamic change of the landscape(Kim, J. W., 2011).

6)Flow direction of the stream converting to opposite direction

[Table 2-2] Sub-wetlands of Upo wetland(Nakdong Changnyeong Water System Management Committee, 2013) reconstructed by Author

Main Source of water	Length (km)	Surface Area(km^2)	Average width(km)	Relative Sub-wetland	Counter flow
Topyeung Steram*	30.0	123.17	4.11	Upo	O
Daehap Stream	8.5	9.14	1.07	Mokpo	X
Chogok Stream	4.5	9.95	2.21	Sajipo	X
Pyungji Stream	6.2	17.17	2.77	Jjokjibul	X

Such dynamic changes of the landscape provide diverse forms of habitats, which have great impact on biodiversity (Oh, K. H., 2004; Kim, T. G., 2007; Ahn, K. H., 2009; USDA, 1998). [Table 2-3] shows varieties of species recognized for its ecological values by different organizations.

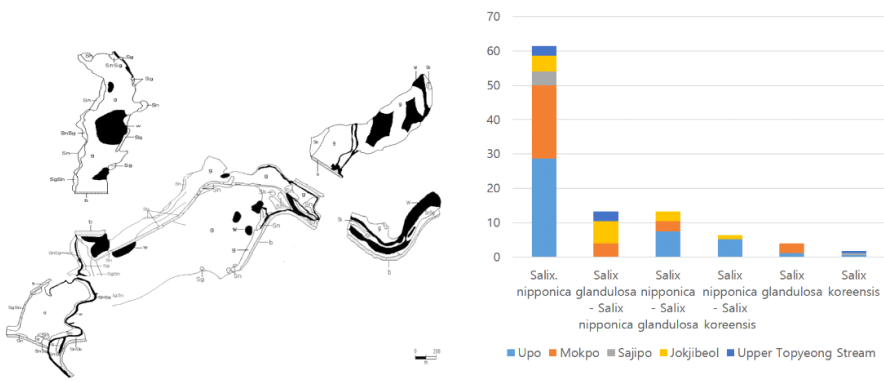
[Table 2-3] Species found in Upo wetland with various recognitions approved by numerous organizations; A- Critical Species Level I(Ministry of Environment, 2016), B- Critical Species Level II(Ministray of Environment, 2016), C- Near threatened Rare plant species(Korea Forest Service, 2012), D- Threatened Rare plant species(Korea Forest Service, 2012), E- Natural monument(Cultural heritage administration, 2016)

Type	Species	A	B	C	D	E
Plants	*Acorus calamus* L.			●		
	Hydrocharis dubia			●		
	Aristolochia contorta			●		
	Euryale ferox Salisb.		●		●	
Birds	*Platalea leucorodia*	●				●
	Platalea minor	●				●
	Ciconia boyciana	●				●
	Haliaeetus albicilla	●				●
	Cygnus columbianus		●			
	Charadrius placidus		●			
	*Anser fabalis**		●			
	Cygnus cygnus		●			●
	Accipiter gentilis		●			
	Milvus migrans		●			
	Pitta nympha		●			●
	Buteo buteo		●			
	Falco subbuteo		●			
	Aix galericulata					●
	Falco tinnunculus interstinctus					●
	Circus cyaneus					●
	Accipiter nisus					●
Mammals	*Utra lutra*	●				●
	Martes flavigula koreana		●			
	Prionailurus bengalensis		●			
Shellfish	*Cristaria plicata*	●				
Reptile	*Kaloula borealis*		●			
	Chinemys reevesii		●			●

Monitoring on specific species have been conducted through various projects such as 'Intensive survey on the wetland protection areas'(National Institute of Environmental Research, 2006; National Institute of Environmental Research, 2011), 'National ecosystem survey'' (National Institute of Environmental Research, 2014) and 'Winter water bird census of Korea' (National Institute of Biological Resources,

2007-2014). Moreover, numerous researches related to the environmental status of Upo wetland have been proposed based on the data collected by national institutes and additional monitoring (Kim, T. G., 2007; Kang, M. J.,, 2007; Ahn, K. H., 2009; Kim, H. J., 2012).

Kim, T. G.(2007) analyzed distribution and production of Fragile willow (*Salix nipponica*), Giant pussy willow (*Salix glandulosa*) and five other willow species within wetland protection area from April 2005 to April 2006 and proved that *S. nipponica* and *S. glandulosa* are the dominant species distributed over the wetland as shown in [Figure2-2]

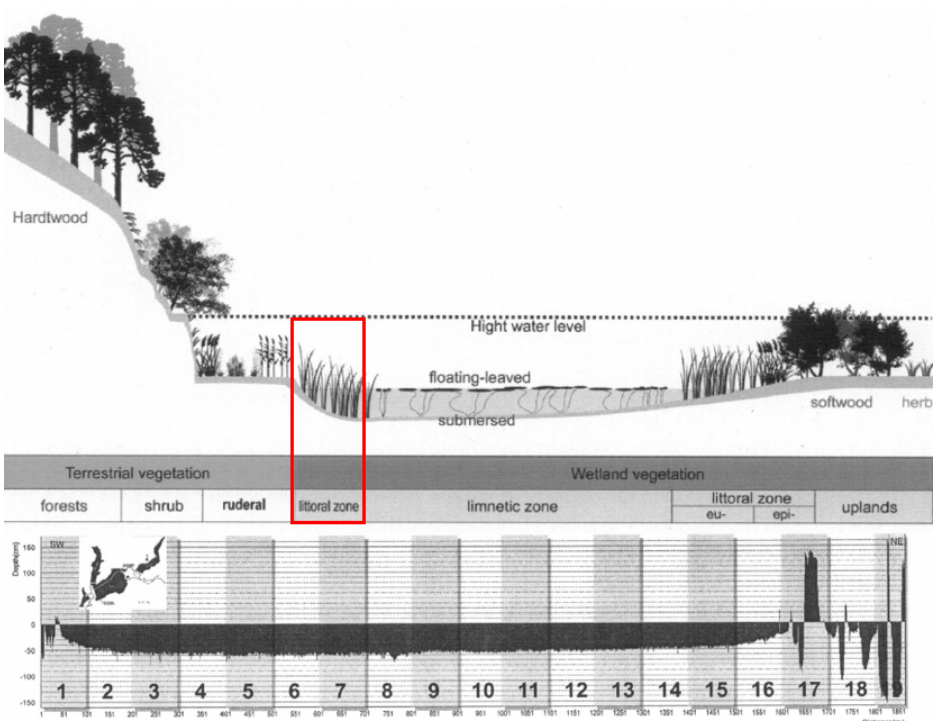


[Figure 2-2] Distribution of Salicaceae family(Kim, T. G., 2007) edited by reconstructed by author; *Salix. nipponica; Salix nipponica - Salix glandulosa; Salix nipponica - Salix koreensis; Salix glandulosa; Salix koreensis*

Kang, M. J.(2007) analyzed distribution and primary production of vascular hydrophytes and hygrophytes of Upo wetland to verify the status of the specific types of vegetation, which are the indicator species of healthy wetland condition. It was found that *Zizania latifolia*, *Phragmites communis*, *Monochoria korsakowi* and Miscanthus sacchariflorus were the dominant species out of 20 kinds of emergent

plants, 6 kinds of floating-leaved plants, 5 kinds of free-floating plants, 7 kinds of submersed plants.

Ahn, K. H. (2009) pointed that previous actual vegetation maps proposed by numerous researchers and national institutes had diverse deficiencies related to littoral zone of the wetland by verifying inundated topography of Upo wetland as shown in [Figure 2-3].

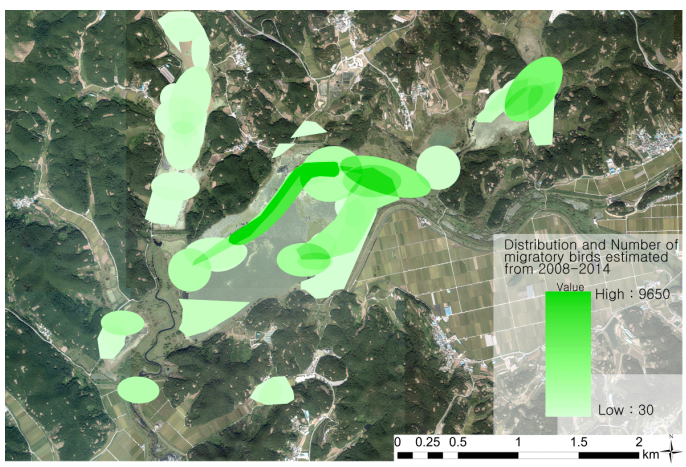


[Figure 2-3] Sectional view of different vegetation zones including littoral zone (Ahn, 2009)

An inundate topography of Upo wetland appears to be in form of abnormal shape as the areas were exposed to frequent fishing activities and other human activities. Ahn, K. H. (2009) also proposed potential floodplain for classifying areas exposed to flooding in 5 different levels which influences the habitats of vegetation. Based on

findings, it is proved that major vegetations of the wetland have been influenced by continuous human activities especially where *Carex dimorpholepis* Steud. communities and *Carex dimorpholpis* Steud. - *Salix subfragilis* communities are located; Originally developed from left fallowed field. Ahn (2009) concluded that since the form of Upo wetland has been changed by humans over time, the wetland needs sustainable management in the surface area and potential flood plains rather than unconditional protection of water surface.

Kim, H. J (2012) analyzed distribution of Anser fabalis[7] based on the data collected by national institue of biological resources as shown in [Figure 2-4] and actual vegetation maps created by Kang, M. J. (2007) and Kim, T. G. (2007).



[Figure 2-4] Distribution and number of threatened bird species from 2008 to 2014

Source : National Institute of Biological Resources(2008-2016)

The researcher proved that *Anser fabalis* communities were concentrated over the areas where hygrophytes such as *Zizania Latifolia, Ceratophyllum demersum* L.,

7) Bean goose the dominant winter bird species of Upo wetland

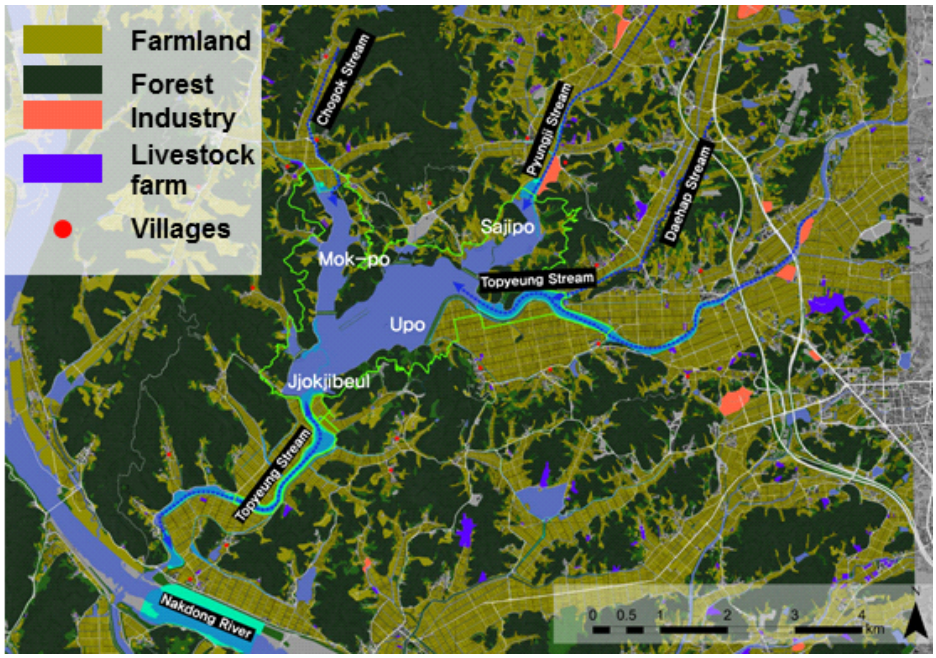
Hydrocharis dubia and *Salvinia natans* communities existed as the birds feed on such plants. When the temperature reaches freezing point, foraging for hygrophytes gets more difficult, therefore, *Anser fabalis* communities look for left fallowed field or rice paddies located around the wetland to feed on. Since majority of the fields are used for growing garlic and onions, number of *Anser fabalis* are found to be decreasing yearly. The researcher insisted that strategies for providing habitats for conservation of *Anser fabalis* communities are needed through restoration of the wetland and changes in crop cultivation especially over Daedae-ri which creates better environment for *Anser fabalis* communities. Additionally, it was insisted that decreasing number of other threatened species of Upo wetland were observed due to limited resources to feed on (Ministry of Environment, 2011).

Overall, various researches on status of biological species of Upo wetland with ecological values have proved that distribution of important species are interrelated to each other. Additionally, distribution of the species are influenced not only by the wetland environment but also the surrounding environment which are negatively influenced by varieties of human activities.

2.1.2. Human Impact on Wetland Environment and Pre-existing Solutions

There are numerous researches insisting that Upo wetland is exposed to contaminations caused by various human activities (Ministry of Environment, 2002; Oh, K. H., 2004; Seo, D. J., 2006; GDI, 2007; Kim, T. G., 2007; Ahn, K. H., 2009; Nakdong River Basin Environmental Institution, 2011; Jun, T. S., 2017).

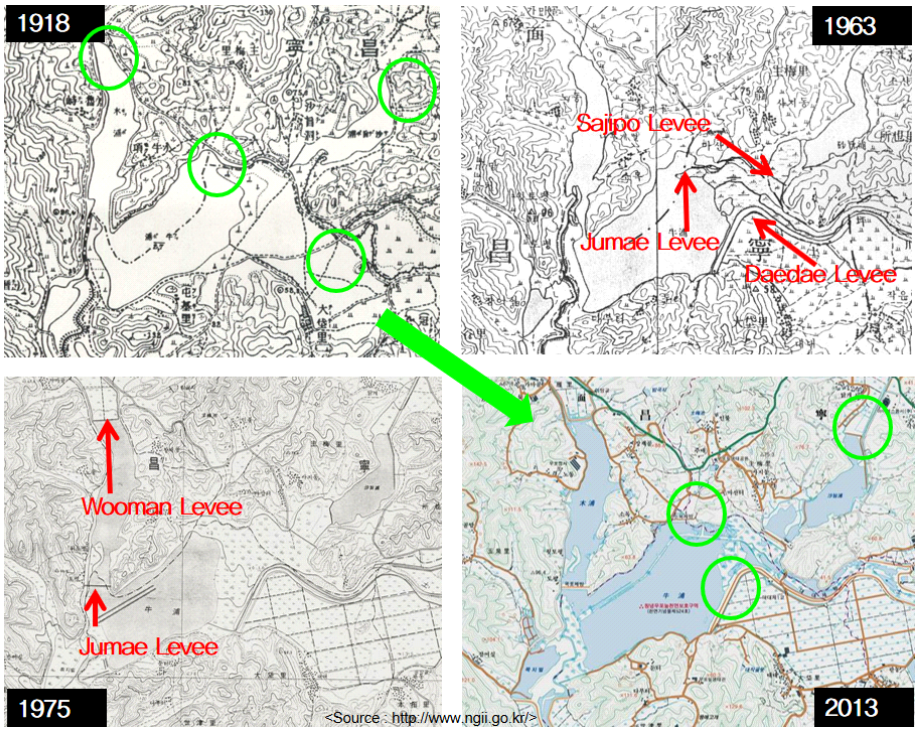
Large portion of Upo wetland protection area are currently surrounded by agricultural land as shown in [Figure 2-5].



[Figure 2-5] Large scale land cover map showing distribution of farmlands surrounding Upo wetland along the streams

Source of data : Ministry of Environment(2013)

A reclamation of the wetland began in the 1960s to create agricultural land for securing food by the residents and in the 1970s, Korea Agricultural and Rural Infrastructure Corporation developed 32hectare of the wetland into rice paddy followed by continuous constructions of Sajipo levee in 1976, Mokpo and Jjokjibeul levee in 1982 which resulted in 1/3 loss of previous wetland surface (Ministry of Environment, 2002) as shown in [Figure 2-6].



[Figure 2-6] Changes of Upo wetland over time modified by author.
Source : National Geographic Information Institute of Korea

Oh, K. H., (2004) analyzed changes of the flora and distribution of the vascular hydrophytes and hygrophytes; before and after flooding from September, 2002 to October, 2003 within Upo wetland environment. Oh, K. H., (2004) and Nakdong River Basin Environmental Institution(2011) insisted that fragmented areas influenced by human activities like construction of roads and levees are most likely to be dominated by exotic plant species over the native plant species. Furthermore, such consequence may result in degradation of biodiversity of the wetland in general (Oh, K. H., 2004).

Nowadays, the main grain crop being produced around Upo wetland is rice and two main vegetables are onion and garlic which are cultivated in forms of two crop

farming(Seo, D. J., 2006). Two crop farming is a type of cultivation practice which uses the land all year round cultivating rice from June to October followed by onions or garlic from October to June, which provides high yields to the communities of Upo wetland (Seo, D. J., 2006). Although, typical agricultural activities and other land-use may contaminate the wetland environment in form of non-point pollution with the flow of the water surface merging with the upper stream of numerous streams entering Upo wetland (Ministry of Environment, 2002; Seo, D. J., 2006). To be more specific, it is proved that the highest concentration of phosphorus was verified during transplanting of the rice shoot into paddy field in June and when the fields were being emptied in November, which eventually enters into upper stream connected to Upo wetland (Yoon et al, 2010). The general cultivation being practiced by the residents of Upo wetland are not as environmentally suitable due to hydrology of the wetland.

To tackle existing environmental problems, numerous projects have been proposed for conservation of Upo wetland by national institutes as shown in [Table 2-4].

[Table 2-4] Projects for sustainable management of Upo wetland proposed by National institutions.

Title	Purpose
Upo wetland natural ecosystem conservation area[8)]	1. Promote wise use and conservation of wetland by establishment of medium and long term planning for systematic conservation and management. 2. Establishing management solution for Upo wetland through field survey, literature review integration of pre-existing data from monitoring
Establishment of master plan for Conservation and restoration of Upo wetland[9)]	1. Sustainability and restoration of Ecosystem through establishment of countermeasure for restoration and comprehensive conservation. 2. Improvement of awareness, and systematic management and research through establishment of wetland management organization in national scale. 3. Promote the participation of local residents and wise use of wetland ecosystem.
Conservation and utilization plan of Upo wetland protection area[10)]	1. Management solution for wetland ecosystem 2. Improvement of biodiversity 3. Improvement of awareness towards environment

Ministry of Environment (2002) pointed that increasing number of visitors, non-point source pollution flowing into the wetland from surrounding farmlands, exotic species, indiscrete fishing activities and construction of roads around the wetland as problems of Upo wetland. GDI (2007) pointed that comprehensive management plan, local resident-led management, coexistence of local residents and natural environment are needed. Nakdong River Basin Environmental Institution(2011) pointed that construction of habitats for wild species, purchase of private land within wetland protection area, management of Topyeung stream, management of exotic and native species, preparation of programs for monitoring and resident involvements are needed for sustainable management of Upo wetland.

To find solutions for such problems, national institutes mentioned analyzed

8) Ministry of Environment(2002)
9) GDI(2007)
10) Nakdong River Basin Environmental Institution(2011)

ecological environment and human social environment of Upo wetland. [Table 2-5] shows the general methodologies used by different national institutes for analyzing environment of Upo wetland.

[Table 2-5] Types of analysis used for each project; A: Establishment of master plan for Conservation and restoration of Upo wetland; B: Upo wetland natural ecosystem conservation area; C: Conservation and utilization plan of Upo wetland protection area

Project	Ecological Environment			Human Social Environment	
	Geographical Database	Field Investigation	Literature Review	Survey	Interview
A	●	●	●		
B	●	●	●	●	●
C	●	●	●		

Ministry of Environment (2002) analyzed ecological environment of Upo wetland through integration of pre-existing literatures and field investigation. Human social environment was analyzed through literature review including civil affair documents and pre-existing literatures.

More detailed analysis on human social environment was conducted by GDI (2007). Along with analysis on ecological environment of Upo wetland, the institute conducted a survey on 227 residents residing around the wetland and interview with several residents. The survey included questionnaires about satisfaction of the governance, willingness to participate in conservation of Upo wetland, intention to participate in Ramsar converntion[11]. Furthermore, the project proved that 87% of survey participants felt the regulation has strengthened after designation of wetland protection area and 66.1% felt that tourism activities do not support local economies.

11) The 10th Ramsar conference of the contracting parties held in Chanwon city, Gyeongsangnamdo Province, Korea in 2008

Nakdong River Basin Environmental Institution(2011) analyzed Upo wetland through integration of pre-existing monitoring data of ecological status using GIS, collections literatures including statistical and geographical information related to human social environment with focuses on population, occupation, land cover and land use in regional scale.

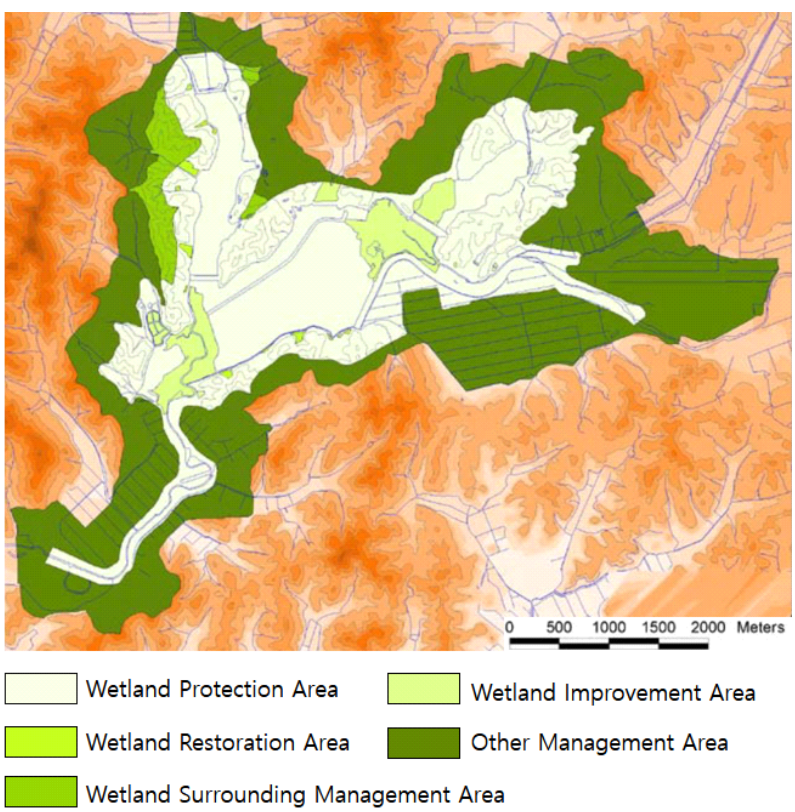
All three projects insisted that ecotourism is one of the important factors for sustainable management of Upo wetland with an active involvement of local residents. Despite of analysis on ecological and human social environment, the proposed solutions are limited inside of Upo wetland protection area. Furthermore, the proposals are not fully applicable to the site as the solutions do not go along with livelihood of the residents around the wetland.

There are numerous deficiencies of analysis on ecological environment, Ministry of Environment (2002), GDI (2007) and Nakdong River Basin Environmental Institution (2011) depended on pre-existing information derived from remote sensing, monitoring and field investigations. Due to broad size of wetland, analysis on ecological environment of the whole wetland in detail is limited. Therefore, analysis on ecological environment based on specific sites and specific time of the year or regional scale when using remote sensing is commonly used.

There are deficiencies of analysis on human social environment, Ministry of Environment (2002) focused on whole county rather than communities around Upo wetland. Industrial structure, land mark, transportation, number of population, or land use zoning in wide administrative scale rather than focusing on specific communities. GDI(2007) additionally conducted surveys and interviews with local residents. Although, with application of random sampling, the location of the participations were unclear, which resulted in identifying conceptual and general problems related to governance rather than site specific problems related to management of Upo

wetland. Nakdong River Basin Environmental Institution(2011) focused on infrastructures, land use and tourism status of Upo wetland rather than identifying groups of villages with different characteristics.

Ministry of Environment(2002) proposed spatial zoning based on conceptual model of Man and the Biosphere Programme(MAB) of United Nations Educational, Scientific and Cultural Organization(UNESCO) for conservation, use of protection area, 'the Natrual Environment Conservation Act', and 'Wetland Conservation Act' as shown in [Figure 2-7].



[Figure 2-7] Spatial zoning of Upo wetland
Source : Ministry of Environment, 2002

The spatial zoning proposed by Ministry of Environment(2002) consists of 5 different zones. [Table 2-6] shows the criteria used for setting each zones and relative measures. Based on zoning variety of ecotourism programs facilities are proposed with a conceptual approach.

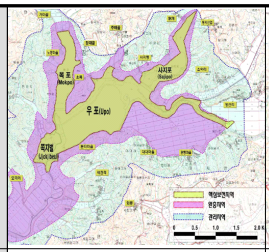
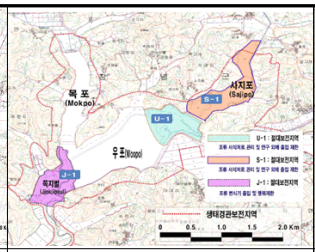
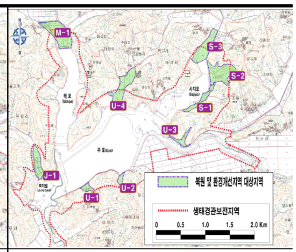
[Table 2-6] Criteria used for setting each zones and relative measures.

Zone	Criteria	Measures
Wetland Protection Area	Surface water of Upo wetland	Activities under the wetland conservation act
Wetland Restoration Area	Land formed by wetland reclamation	Restore and follow Act on the Utilization and Management of the National Territory
Wetland Improvement Area	Wetland that are damaged or currently being transformed by reclamation	Promote inhibition of ongoing landization and restoration
Wetland Surrounding Management Area	Area less than 50% of wetland protection area around the wetland	Active management on point and non-point source pollution
Other Management Area	Areas with facilities supporting ecotourism and livelihood of residents	Support ecotourism and livelihood of the residents

Source : Ministry of Environment, 2002

GDI (2007) proposed zoning from varieties of perspectives such as conservation, restoration and intensive management based on findings of analysis on ecological and human social environment as shown in [Table 2-7].

[Table 2-7] Zoning for conservation, restoration and intensive management of Upo wetland

Zoning			
Purpose	Conservation of Upo wetland	Management of Core area of Upo wetland	Restoration of Upo wetland
Contents	• Core area • Buffer area • Management Area	• Monitoring • Controlling accessability	• Rehabilitation • Renewal • Restoration • Enhancement • Mitigation

Source : GDI (2007)

Based on the zoning, diverse programs and facilities for conservation and ecotourism are proposed. The programs consists of conceptual approach and suggests way of using natural resource and traditional culture, which are suitable for visitors except the residents.

Overall, resident participation plays an important role when it comes to promoting wise use of natural resources(Korea Environment Institute, 2011) and every purpose proposed by the projects mentioned above include securing incomes of local community. MAB of UNESCO insist that resident participation is essential in decision making process with the concept called Quality Economies, which is defined as sustainability and conservation of natural resources while improving life quality of the residents. Quality Economies is a comprehensive concept which includes activities, products and services produced from agriculture, industry, ecotourism, forestry, fishery and other activities(Zbigniew Niewiadomski, 2005). Additionally, Korea Environment Institute(2011) insisted that Upo wetland has been suffering from serious conflicts between local residents and the government over development and

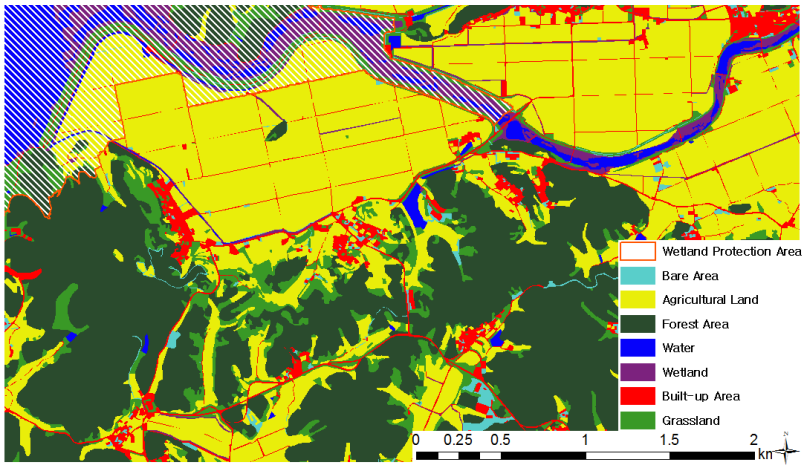
conservations despite of its great ecological value.

Regardless of comprehensive management and conservation plans proposed by various national institutes, none of the proposals above considered the specific challenges, concerns and regarding reasons perceived by local residents in the process of making spatial plans and relative programs.

2.1.3. Status of Topyeung Stream

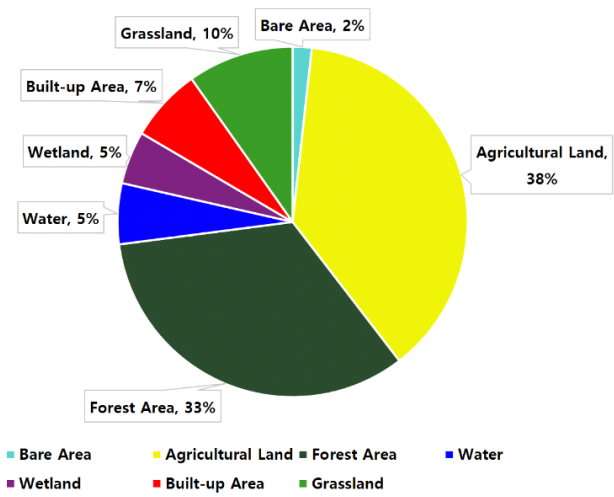
Various researchers insisted that serious management for Topyeung stream is required (Kim, 2007; Seo, 2009; Kim, 2010; Jun, 2017). Upper Topyeung stream is exposed to diverse human activities since Changnyeong-eup county[12] is located next to the stream and great amount of farmlands along the stream are cultivated by communities appearing as built-up area. Additionally, [Figure 2-8] shows boundaries of wetland protection area existing in the middle of upper Topyeung stream, which indicate different management is being applied despited of same type of land cover status.

12) Largest county of Changnyeong-gun city with population of 17,453 forming 26.3% of total population of the city(Changnyeong-gun, 2015)



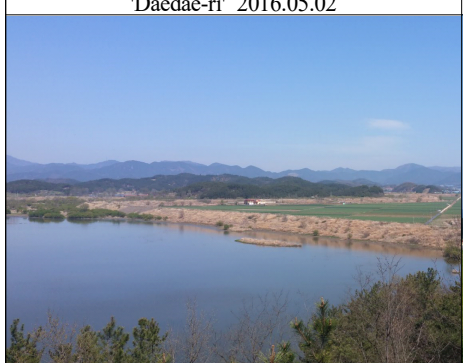
[Figure 2-8] Land cover map of surrounding areas of upper Topyeong stream
Source : Ministry of Environment(www.egis.me.go.kr)

[Figure 2-19] shows the proportion of the land cover within research site, 'Agricultural land'(38%) and 'Built-up Area'(7%) occupy 45% of the whole area where as 'Wetland'(5%) and 'Water'(5%) occupy only 10% of the research site, which flows through the 'Agricultural land' and 'Built-up Area' where most of human activities are being practiced.



By looking at such proportion, great amount of point and non-point source pollution from 'Agricultural land' are expected to flow into Upo wetland through upper Topyeung stream without proper management as shown in [Figure 2-8].

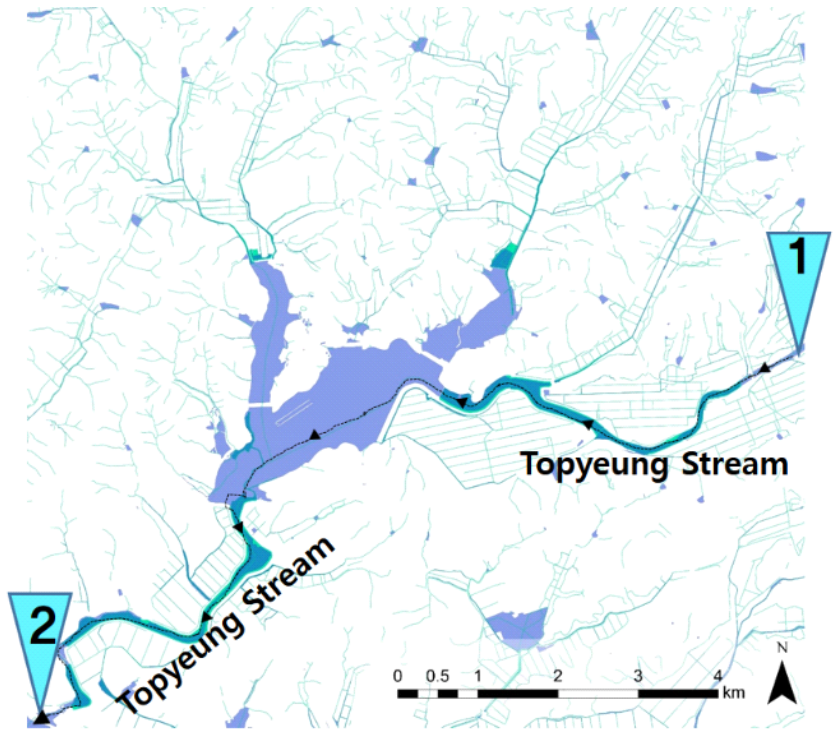
[Table 2-8] Types of Agricultural activities around Upo wetland

	
A. Man spraying herbicide on Onion field at 'Daedae-ri' 2016.05.02	B. Persimmon Orchard next to the pond at 'Dongsan-ri'2016.05.02
	
C. View of Onion fields right next to Upo wetland 2016.04.05	D. View of rice paddies at 'Daedae- ri' 2016.08.18

Kim(2007) examined overall status of Upo wetland with a focus on pollution situation by observing distribution of flora and fauna, and landscape from 2005 to 2006. The researcher claimed that upper Topyeung stream was exposed to domestic sewage, domestic waste, livestock waste water and chemicals used for agricultural activities. Seo(2009) expressed that Topyeung stream urgently needs management system for non-point source pollution, since only Upo wetland is being protected

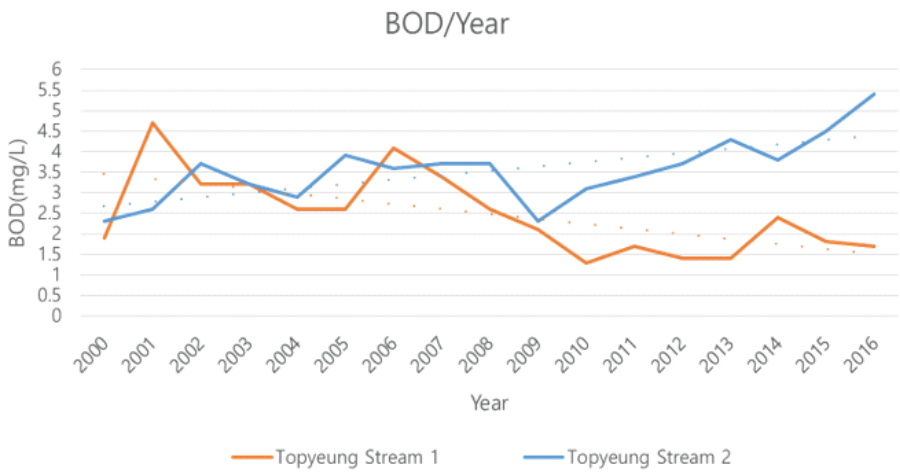
under wetland conservation act rather than whole basin connected to the wetland. Kim(2010) insisted that there were increasing amount of phosphorus and Pine pollen, and dramatical decrease in amount of carbon and nitrogen in sediment particle of Upo wetland overtime since 1930s. Such results indicate that form of Upo wetland has gone through a great change compare to past 2000 years and there was a great amount of chemical fertilizer flowing into the wetland since 1930. It was proved that the highest concentration of phosphorus was verified during transplanting of the rice shoot into paddy field in June and when the fields were being emptied in November for planting shoots of garlic or onion, which eventually enters into upper stream connected to Upo wetland(Yoon et al, 2010). Jun, T.S.(2017) analyzed the water quality of Topyeung stream by using water quality data[13] sampled by National Institute of Environmental Research. The data was sampled at 2 different observation points along Topyeung stream from 2005 to 2016 as shown in [Figure 2-10].

13) Biochemical Oxygen Demand, concentration of Suspended Solid, total Nitrogen and total Phosphorus monitored monthly and yearly.



[Figure 2-10] Observation points of Topyeung stream

The researcher conducted comparative analysis on the concentration of polluting factors. Based on the analysis, the researcher insisted that systematic plans for management and control of point and non-point source pollution released from upper Topyeung stream are needed as greater concentration of Biochemical Oxygen Demand and Suspended Solids were observed at lower Topyeung stream than upper Topyeung stream as shown in [Figure 2-11].



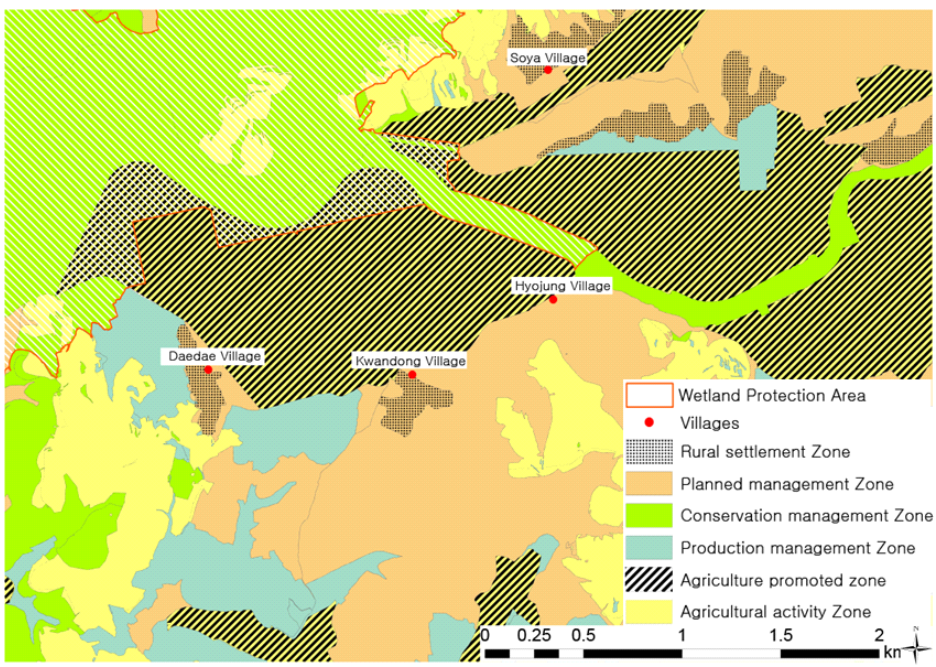
[Figure 2-11] Graph showing the yearly changes of concentration of Biochemical Oxygen Demand from year of 2000-2016

Source : National Institute of Environmental Resources

Regarding problems pointed by various researchers, 'Farmland purchasement program' have been going along by Ministry of Envrionment since 1998(Ministry of Environment, 2002). Furthermore, Ministry of Environment(2002) and GDI(2007) insisted that if purchase of the agricultural land is not manageable, organic cultivation practice need to be introduced urgently as it releases large amount of non-point source pollution. Despite of knowing problems, limiting factors exist due to increasing farmland value as the main crop[14] value increases(2007, 건설교통부). Therefore, the price offered by the government for agricultural land is not negotiable for residents to migrate to other place to continue to cultivate(GDI, 2007; Ministry of Envrionment, 2002). Furthermore, Nakdong River Basin Environmental Institution (2011) pointed that agricultural lands purchased by the government in the past have been left fallowed especially along Daedae-levee, which unintentionally provide habitats for varieties of land plants and exotic species.

14) Onions and Garlic

As upper Topyeung stream is proved to have various issues related to conservation activities and human activities, following contents cover current land use zonings designated by Ministry of Land, Infrastructure and Transport under National Land Planning and Utilization Act, and Wetland Conservation Act. [Figure 2-12] shows current land use zoning along upper Topyeung stream.



[Figure 2-12] Current land use zonings of upper Topyeung stream
Source : Korea National Spatial Dada Infrastructure Portal

There are 7 different zones within research site and each zones have different allowance and restrictions based on different purposes. Wetland Protection Area(WPA) is designated to conserve areas with high biodiversity or natural environment with aboriginality, and areas that provide habitats for rare or endangered species. WPA allows establishment of facilities for education such as wooden bridge,

directional sign and facilities for management. Additionally, WPA allows changes of landform for improvement of the wetland condition and residents to cultivate native species with permission given under certain condition.

Rural Settlement Zone(RSZ) is designated to support maintenance of rural settlement within a green area. RSZ allows construction of buildings for improvement of life quality of the residents while restricting buildings with more than 4 stories above ground level. Planned Management Zone(PMZ) is designated to prepare area for urbanization, which require appropriate plans and systematic management with consideration of natural environment. PMZ allows establishment of factories operated by the government for providing public needs with approved integrated processing facilities that guarantee zero impact on natural and living environment. Additionally, PMZ allows construction of facilities for accommodation with proper sewage system while restricting buildings with more than 4 stories above ground level. Sales facilities with areas less than 3000 square metre with approved development management plans is allowed. Although, PMZ restricts establishment of various facilities for waste disposal, elementary school, welfare, broadcasting, job training and other facilities that are related to animal, plant, cemetery and vehicle. Conservation Management Zone (CMZ) is designated to conserve natural environment, forest, other green areas, ecosystem and prevent water pollution. CMZ allows establishment of educational facilities from kindergarten to high school, facilities for plant and animal cemetery, power generation, broadcasting, funeral, medical, living and religions while restricting facilities that may potentially threat natural environment. Production Management Zone(PRMZ) is designated to promote agriculture, aquaculture and forestry related activities where agricultural activity zone is not suitable. PRMZ allows establishment of multi-unit dwelling, buildings for education, welfare service, animals, plants, broadcasting, training, medical service,

waste disposal, accommodation, elementary school and warehouse sales. Although, PRMZ restricts buildings with more than 4 stories above ground level and facilities related to tourism, universities or colleges, accommodation, business, transportation, amusement, neighbourhood, religious and warehouse for merchandise purpose. Agriculture Promoted Zone(APZ) is designated to promote mass production of crops within large plots of farmland. APZ allows any agricultural activities and establishment of ware house, sports facilities, public parking lots, public bath operated by the farmers only. Additionally, establishment of facilities with area less than 10000 square metre for agricultural experience such as accommodation, horse riding course, service food facilities under the condition that all the facilities are operated by the farmers. Furthermore, less than area of 1000 square metre is allowed to providi opportunities for visitors to harvest and purchase local products,although, land use other than agricultural production are strongly restricted. Agricultural Zone(AZ) is designated to promote agricultural industry and conservation of the forest. Within AZ establishment of such facilities for plants and animals, cemetery, cultural experience, broadcasting, waste handling, accommodation for training purpose only, ware house for storing dangerous contents, funeral, medical purpose, living, religion and single residential unit are allowed as long as there is no impact on natural environment.

Although, [Figure 2-11] shows the complex identity of each zonings as some areas are designated with more than two different zones at a time. In this case, combinations of zoning can be seen in [Table 2-9].

[Table 2-9] More than two zones being overlapped over specific area: A; B; C; D; E; F.

Zone	A	B	C	D	E	F
Wetland Protection Area	●	●	●	●		
Rural Settlement Zone					●	
Planned Management Zone		●			●	
Conservation Management Zone				●		
Production Management Zone						
Agriculture Promoted Zone	●					●
Agricultural Activity Zone	●		●			●

Different purposes, allowance and restrictions of each zones around upper Topyeung stream have been reviewed and it was found that every single zone had different details for its intention. Since great amount of details of each zones vary the intention of each zones, are classified into either conservation, production or development as shown in [Table 2-10].

[Table 2-10] Intention of different zones around upper Topyeung stream

Zone	Conservation	Production	Development
Wetland Protection Area	●		
Rural Settlement Zone			●
Planned Management Zone			●
Conservation Management Zone	●		
Production Management Zone		●	
Agriculture Promoted Zone		●	
Agricultural Activity Zone		●	

Cho(2010) analyzed the phenomenon derived from overlap of multiple protection areas by conducting a survey with the managers of various protection area and

insisted that purpose of overlapping zones will eventually become inefficient due to diversification of managements. To resolve such problems Cho (2010) suggested that comprehensive planning is needed for protection areas being overlapped for systematic management. Such concept could be applied to overlapping land use zones of research site such as area 'A' and 'C' mentioned in [Table 2-6]. Each zones have different intentions such as conservation, production and development. Although, coexistence of conservation and agricultural production, or conservation and development may result in diversification as Cho (2010) mentioned. Therefore, comprehensive management plan may resolve existing problems of upper Topyeung stream area.

2.2. Ecotourism

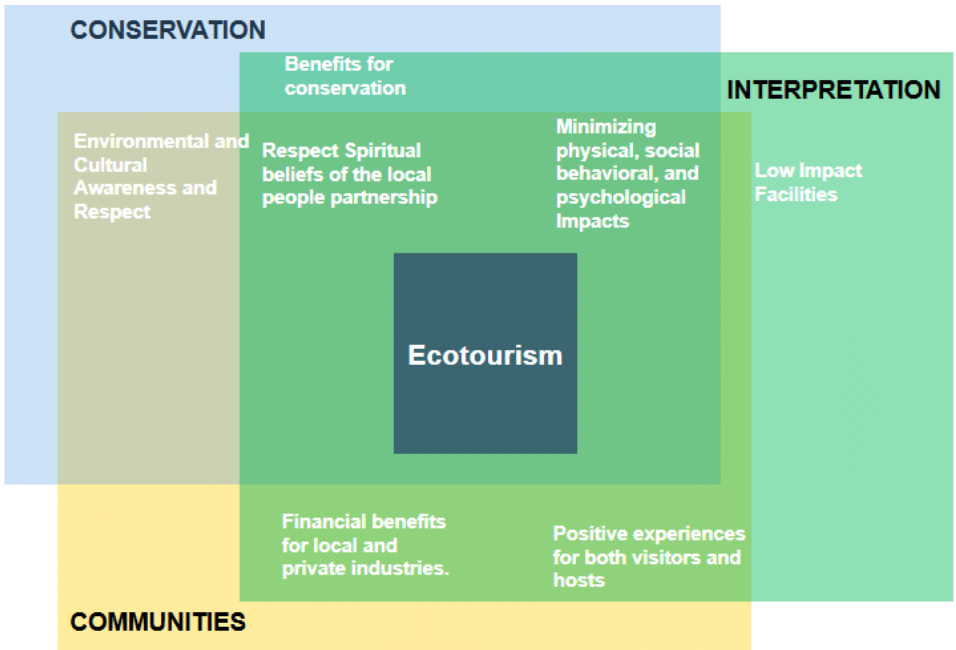
2.2.1. Concept and Principles of Ecotourism

2.2.1.1. Concept and definition of Ecotourism

There has been growing attention towards economical value of tourism from various countries due to increasing number of tourists internationally, since 1990s. Such phenomenon resulted in threatening cultures and biodiversity of tourist destinations (UNEP, 2002). Growing awareness and demand of the time for environment resulted in creating new terminologies such as 'Sustainable development', 'Environmentally friendly product' and 'Ecotourism' (Cho, J. H., 2014). The term 'Ecotourism' was used by Hetzer in 1965 for the first time with intentions to suggest alternative solution for general form of tourism, which were previously 'Environmentally threatening' and 'Resource consuming' (Wallace, 1992). Ecotourism is a type of sustainable tourism and has been defined by numerous researchers from different countries overtime as shown in [Table 2-12]. In 2015, The International Ecotourism Society (TIES) convoked experts from around the world to redefine the principles and definition of ecotourism with goals to provide more clarity, reduce the greenwashing'[15] and wrongful interpretations being used by various tourism industries. The definition and concept was revised with an addition of the term 'Interpretation[16]', which resulted in three conceptual pillars supporting the term ecotourism as shown in [Figure 2-13.

15) Greenwashing is a verb defined as a practice done by industries advertising themselves as a company implementing green management to impress consumers (Terrachoice, 2008)

16)Interpretation : Way of emphasizing on enriching personal experiences and environmental awareness through experience which promotes greater understanding and appreciation for nature, local society, and culture.(TIES, 2015)



[Figure 2-13] Concept of Ecotourism Proposed by The International Ecotourism Society
Source : www.ecotourism.org

Three conceptual pillars were compared with multiple definitions of ecotourism suggested by numerous researchers from around the world to examine the compatibility, importance and validity of the pillars as shown in [Table 2-11; 2-12; 2-13].

[Table 2-11] Definition of Ecotourism proposed by various scientists

Origin	Author	Definition	C	CM	I
Interna -tional	Hetzer(1965)	Tourism based principally upon natural and archaeological resources such as birds and other wildlife, scenic areas, reefs, caves, fossil sites, archaeological sites, wetland, and areas of rare or endangered species			●
	Ceballos-Las curain (1988)	Tourism that involves travelling to relatively undisturbed or uncontaminated natural areas with the specific object of studying, admiring and enjoying the scenery and its wild plants and animals	●		●
	Ziffer (1989)	A form of tourism inspired primarily by the natural history of an area, including its indigenous cultures. The ecotourist visits relatively undeveloped areas in the sprit of appreciation, participation and sensitivity. The ecotourist practices a non-consumptive use of wild-life and natural resources and contributes to the visited area through labour or financial means aimed at directly, benefiting the conservation of the site and the economic well-being of the local residents	●	●	●
	The International Ecotourism Society (1990)	Responsible travel to natural areas that conserves the environment and sustains the well being of local people	●	●	●
	Figgis (unpublished , 1992)	Travel to remote or natural areas which aims to enhance understanding and appreciation of the natural environment and cultural heritage while avoiding damage or deterioration of the experience for others	●		●

Source : Björk(1995)

C : Conservation, CM : Community, I : Interpretation

[Table 2-12] Definition of Ecotourism proposed by various scientists(Continued)

Origin	Author	Definition	C	CM	I
International	Allcock et al. (1993)	Nature-based tourism that includes an educational component and is managed to be sustainable	●		●
	Valentine (1993)	Nature based tourism that is ecologically sustainable and is based on relatively undisturbed natural areas; is non-damaging and non-degrading; provides a direct contribution to the continued protection and management of protected areas used; and is subject to an adequate and appropriate management regime	●		●
	Wight (1993)	An enlightening nature travel experience that contributes to conservation of the ecosystem, while respecting the integrity of host communities	●	●	●
	Björk (1995)	An activity where the tourist travels to nature areas in order to admire, study and enjoy the existing nature and culture in a way that does not exploit the resources, but contribute to the conservation of the genuine environment	●	●	●
	World Conserva-tion Union (1996)	Environmentally responsible travel and visitation to relatively undisturbed natural areas, which promote conservation in a way of enjoying and appreciating nature and culture with low negative visitor impact while supporting beneficial active socio-economic involvement of local populations	●	●	●
	Cristina (2004)	Ecotourism involves visiting natural areas with the objectives of learning, studying or participating in activities that do not bring negative effects to the environment; whilst protecting and empowering the local community socially and economically	●	●	●
	TIES(2015)	Responsible travel to natural areas that conserves the environment, sustains the well-being of the local people and involves interpretation and education	●	●	●

[Table 2-13] Definition of Ecotourism proposed by various scientists(Continued)

Origin	Author	Definition	C	CM	I
Korea	Kang, M. H.,(1999)	Tourism in nature which supports conservation while securing sustainablity of tourism industry with provision of diverse type of environmental education to improve awareness of the tourists	●	●	●
	Roh, Y. H.,(2004)	Non-consuming and educational natural tourism visiting undisturbed natural area which provides economical benefits to local communities and natural, historical and cultural experiences to visitors	●	●	●
	Choi, Y. G.,(2005)	A broad concept that consists of the concepts of agrotourism, cultural tourism and natural tourism within protection area	●		●

C : Conservation, CM : Community, I : Interpretation

After going through the meaning and intention of definitions it was found that most definitions included two conceptual pillars, which are 'Conservation' and 'Interpretation'. Additioanally, as time goes by the definitions were defined with more detail. Furthermore, the meanings of 'Community' were missing in the definitions suggested before 1993 except for the definitions suggested by Ziffer (1989) and The International Ecotourism Society(TIES, 1990), which indicate that the term ecotourism has been defined with tourist oriented perspective. Ministry of Culture, Sports and Tourism (2010) drew 7 characteristics derived from ambiguous definitions of ecotourism. Such characteristics are summarized as active participation for conservation and sustainability of nature of site, environmental education and explanation, assurance of active support of local community, promotion of the development of local economy based on local activities, guaranteed benefit for conservation of environment, support oriented development rather than demand, and achievement of societal, economical and environmental goals.

2.2.1.2. Principles of Ecotourism

Today, majority of researches related to ecotourism have local characteristics (Lee, 2016), which can be rephrased that the concept of ecotourism may vary due to different environmental and natural characteristics of local area.

There are numerous principles supplementing ecotourism to make its absolute definition applicable and realistic. In 1996, ECO-Certification Program of Australia was firstly announced and then diverse principles have been suggested from around the world for stakeholders to refer when initiating ecotourism.

In this research, three reputable principles are examined to see validity and precision of the concept suggested by TIES (2015). Wallece et al. (1996) suggested 6 principles for evaluating ecotourism destination located in Amazon, Brazil. Six suggested principles were compared with the tree conceptual pillars mentioned above as shown in [Table 2-14].

[Table 2-14] 6 Principles of Ecotourism proposed by Wallece et al.(1996)

Principles	Contents	C	CM	I
1	Entails a type of use that minimizes negative impacts to the environment and to local people.	●		
2	Increase the awareness and understanding of an area's natural and cultural systems and the subsequent involvement in issues that affect them.			●
3	Contributes to the conservation and management of legally protected and other natural areas.	●		
4	Maximizes the early and long-term participation of local people in the decision process that determines the kind and amount of tourism that should occur.		●	
5	Directs economic and other benefits to local people, which complement rather than overwhelm or replace traditional practices (Farming, Fishing, Social systems).	●	●	
6	Provides special opportunities for local people or nature tourism employees to also utilize natural areas and learn more about the wonders that other visitors come to see.		●	●

C : Conservation, CM : Community, I : Interpretation

The principles mentioned above contain criteria, which is suitable for specific area rather than wide ranges of ecotourism destination and were developed with perspective of sustainable development which support productivity of local residents while securing conservation of environment. Principle 1, 3 and 5 matched with conservation as the keyword of the sentences are considered to be 'minimize negative impacts', 'contributes to the conservation' and 'rather than overwhelm or replace traditional practices'. Principle 4, 5 and 6 matched with community as the keyword of the sentences are considered to be 'participation of local people', 'benefits to local people' and 'opportunities to local people'. Principle 2 and 6 matched with interpretation as the keyword of the sentences are considered to be 'awareness and understanding' and 'learn more about the wonders'.

TIES announced 8 principles in 2015, which are the most recent reputable

principles for people involving in wide ranges of ecotourism industries to refer to. Each principles are compared with conceptual pillars suggested by same organization as shown in [Table 2-15].

[Table 2-15] 8 Principles of Ecotourism proposed by The International Ecotourism Society

Principles	Contents	C	CM	I
1	Minimize physical, social, behavioral, and psychological impacts.	●		
2	Build environmental and cultural awareness, and respect.	●		●
3	Provide positive experiences for both visitors and hosts.		●	●
4	Produce direct financial benefits for conservation.	●		
5	Generate financial benefits for both local people and private industry.		●	
6	Deliver memorable interpretative experiences to visitors that help raise sensitivity to host countries' political, environmental, and social climates.	●		●
7	Design, construct and operate low-impact facilities.	●		
8	Recognize the rights and spiritual beliefs of the Indigenous People in your community and work in partnership with them to create empowerment.	●	●	

C : Conservation, CM : Community, I : Interpretation

Principle 1, 2, 4, 6, 7 and 8 were considered to match the concept conservation as principle 1 contained the words 'Minimize impacts', principle 2 contained the words 'Build environmental awareness', principle 4 contained the words 'benefits for conservation', principle 6 contained the words 'help raise sensitivity to host countries environmental climates', 7 contained the words 'Low impact facilities'. Principle 8 contained the words 'rights and spiritual beliefs of the indigenous people'. Principle 3, 5 and 8 were considered to match the concept community as principle 3 contained the words 'experiences for locals and visitors', principle 5 contained the words 'financial benefits for local people' and principle 8 contained the words 'work in partnership'. Principle 2, 3 and 6 were considered to match the concept interpretation

as principle 2 contained the words 'build awareness and respect', principle 3 contained the words 'positive experiences' and principle 6 contained the words 'deliver memorable interpretative experiences'.

Honey (2008) suggested 7 principles to defend justification of ecotourism from phenomenons of'Greenwashing'and Ecotourism "lite"[17] as shown in [Table 2-16].

[Table 2-16] Principles of Ecotourism proposed by Honey(2008)

Principles	Contents	C	CM	I
1	Travel to natural destinations.			●
2	Minimize impact.	●		
3	Build environmental awareness.			●
4	Provide direct financial benefits for conservation.	●		
5	Provide financial benefits and power for local people.		●	
6	Respect local culture.	●	●	
7	Support human rights and democratic movements.		●	

C : Conservation, CM : Community, I : Interpretation

Principle 2, 4 and 6 were considered to match the concept conservation as principle 2 contained the words 'minimize impact', principle 4 contained the words 'benefits for conservation' and priniciple 6 contained the words 'local culture'. Principle 5, 6 and 7 were considered to match the concept community as priniciple 5 contained the words 'for local people', principle 6 contained the words 'respect local culture' and principle 7 contained the words 'human rights'. Principle 1 and 3 were considered to match the concept interpretation as principle 1 contained the words 'travel to natural destinations' and priniciple 3 contained the words 'environmental awareness'.

17) Ecotourism 'lite'is a cheating of saving appearance by exaggerating the value of ecotourism for industries to save expenses(Honey, 2002).

Overall, the principles mentioned above were examined through context analysis with an application of three conceptual pillars suggested by TIES in 2015. By matching principles with each conceptual pillars, total number of 12 principles matched the concept conservation out of 21, total number of 9 principles matched the concept community out of 21 and 7 principles matched the concept interpretation out of 21. All the principles are practically applicable and have been widely applied to specific ecotourism destinations rather than varieties of complex definitions suggested by researchers from around the world. Since three conceptual pillars matched such reputable principles both conceptual pillars and principles above shell be referred when initiating ecotourism.

2.2.2. Ecotourism in Korea and Challenging factors

2.2.2.1. Introduction of Ecotourism in Korea

Today, the term ecotourism is defined by two legislation of Korea. Ministry of Environment defines ecotourism as ecologically sounding and naturally friendly tourism under 'the Natural Environment Conservation Act'. With the definition ecotourism destinations are designated and supported by Ministry of Environment through site evaluation and screening based on its conservational value and educational value for increasing awareness toward protection of biodiversity. Furthermore, ecotourism is defined as ecologically sound and environmentally friendly tourism by Ministry of Maritime.

In Korea there are great amount of researches about Ecotourism with focuses on diverse subjects such as analysis of attractiveness of ecotourism resources, ecotourism strategies with sustainable development perspectives and various research on awareness and behavior of ecotourists exist(Lee, 2016). Since the concept of ecotourism was officially introduced to Korea for the first time in early 90s the

number of researches on ecotourism gradually increased. In the early period most ecotourism related researches were focused on concept, principles and characteristics throughout the case investigation researches from countries with advanced ecotourism. Followed by researches on analyzing tendency of ecotourism, residents' awareness towards ecotourism, potential of specific areas for ecotourism development and establishment of strategies(Cho. 2014). As Ministry of Environment and Ministry of Culture, Sports and Tourism designated 10 Korean ecotourism sites in 2010 great amount of researches on development of indices, programs and policies with a focus on specific ecotourism sites in Korea were introduced(Ahn et al., 2009; Kang et al., 2010; Lee et al., 2012; Ryu et al., 2012; Lee et al., 2014).

2.2.2.2. Existing Challenges of Ecotourism in Korea

Ahn(1998) conducted a survey on human activities and ecosystem with an involvement of local residents, ecosystem profession and environment education instructor to develop ecotourism plan. At the end of the research Ahn(1998) concluded that resident participation is crucial when planning and managing ecotourism sites. Yoon(2008) conducted a research to discover priorities for consideration when developing ecotourism at mountain villages with an involvement of local residents. Yoon(2008) implemented a survey to identify the local residents' awareness toward ecotourism and their willingness to participate which concluded that education for residents and participation of various stake holders are crucial when planning ecotourism. Yang et al.(2012) conducted a research to analyze the relation of local residents' behavior, awareness and willingness to participate towards ecotourism development. The analysis was implemented in a survey format which consisted of variables of sustainablity, economic reliability, local patriotism, perceived benefits, support level for development and willingness to participate which

concluded that for sound development of ecotourism it is necessary for residents to recognize how ecotourism contributes to local community positively. Additionally, the synergy of local residents and participation will result in formation of virtuous cycle system of sustainable development of both tourism and communities. Lee et al.(2015) used Q methodology to analyze the behavior and subjectivities of diverse stake holders of community operated ecotourism sites. which concluded that 'Education and program' and 'governance' related to ecotourism have a strong effect on local residents' behavior and as there are more opportunities for local residents to participate in managing ecotourism site the intention to involvement increases.

Previous researches related to 'community involved ecotourism' were focused on awareness of local residents towards ecotourism and their willingness. Even though, previous researches concluded that almost every residents were positive about the concept of ecotourism there was a shortage of understanding the governance related to conservation and ecotourism which caused victim mentality. This may be rephrased as that helping local residents understand current status and management related to ecotourism planning will result in enhanced participation of local residents to share their thoughts for better ecotourism.

2.3. Cognitive map

2.3.1. Cognitive map

The term cognitive map is defined as a method to delineate the contents cognized by people(Kim, Y.H, 2011). To be more specific its a representation of image in one's memory based on characteristic of the specific environment and spatial relation(Kim, Y.H, 2011). The term cognition is defined as ways of gaining knowledge or awareness by connecting present or past environmental condition to personal behavior in future or past(Lim, S. B., 1986). The process of cognition in one's brain progresses as follows. Surrounding environment as an object interacts with the one's perception, and once object is selected, one remember the object then memorize, then perceive, and then reproduce the image of object(Shin, M. J., 2014).

Appleyard(1970) analyzed over 200 maps of one typical city and classified cognitive map into sequential map and spatial map. Sequential map is formed based on continuos experience gained along the line or path where as spatial map is formed based on importance or the significance of the point or polygon. When drawing cognitive map it is better to start off with trails then assist participants to develop their cognition into form of polygons as Appleyard(1970) insisted that sequential map is likely to develop and diversify into spatial map overtime.

Down et al.(1973) insisted that human instinct is more like to transfigure the reality, their behavior, expectation to mediate and control environmental impact which result in incomplete, distorted or exaggerated or schematized form of cognitive map. Therefore, its better to gain more samples of cognitive map for identifying specific characteristics of place with great precision. not manually react or adapt to surrounding environment.

Lee, S. J.(2002)

2.3.2. Uses of Cognitive Map

Cognitive map has been used in urban area mostly. Lynch, K.(1960) analyzed how first time visitor cognized the Boston, Jersey City, Los Angeles through sketch mapping and clarified the urban scape based on 5 components of paths, edges, district, nodes and landmark. Cho, S.(1999) analyzed scale of residence environment recognition and classified existing type of cognitive elements through survey and sketch map with participation of housewives in Busan, Korea. Lee, H.(1999) analyzed symbolic image of Cheongju-si city with participation of college student. Kim, H. M.(2000) searched for common images of college campus perceived by employees, students with an application of cognitive map. Lee, S. J.(2002) used cognitive map to analyze the differences between environmental images of recreation space cognized by visitors and managers in Korean folk village. Most of researches that employed cognitive mapping focused on analysing the different patterns of cognition by age, location and the symbolic image of urban scape. Although, cognitive map has not been employed to search areas that would contribute to ecotourism in rural communities of Korea yet.

Chapter 3: Cognitive Mapping and Overlapping Analysis

3.1. cognition of the Villagers Toward Surrounding Environment

Scientific data in regional scale such as land cover map, land use zoning map, digital map, ecological zoning map and many other tools provide important information for decision making in environmental planning and management process. Although, there have been growing expectations for comprehensive planning and management (Korea Environment Institute, 2011) as conservation strategy does not always fit into the livelihood of the residents. Therefore, understanding local residents'cognition towards environment and current status are necessary for sustainable environment planning management. First section of Chapter 3 begins with analysis on the cognition of local residents toward current status of the environment collected through open ended interviews.

3.1.1. Interview

Total number of 45 people were interviewed, which consist of 41 local residents from 22 villages located within two kilometers outside of 'Wetland Protection Area' boundary and four experts involved in 'Japanese Crested Ibis Restoration Research', 'Ramsar Wetland City Accreditation Committee', 'Upo Ecotourism Committee'[1] and 'Green Upo Friends'[2] as shown in [Table 3-1] and [Figure 3-1].

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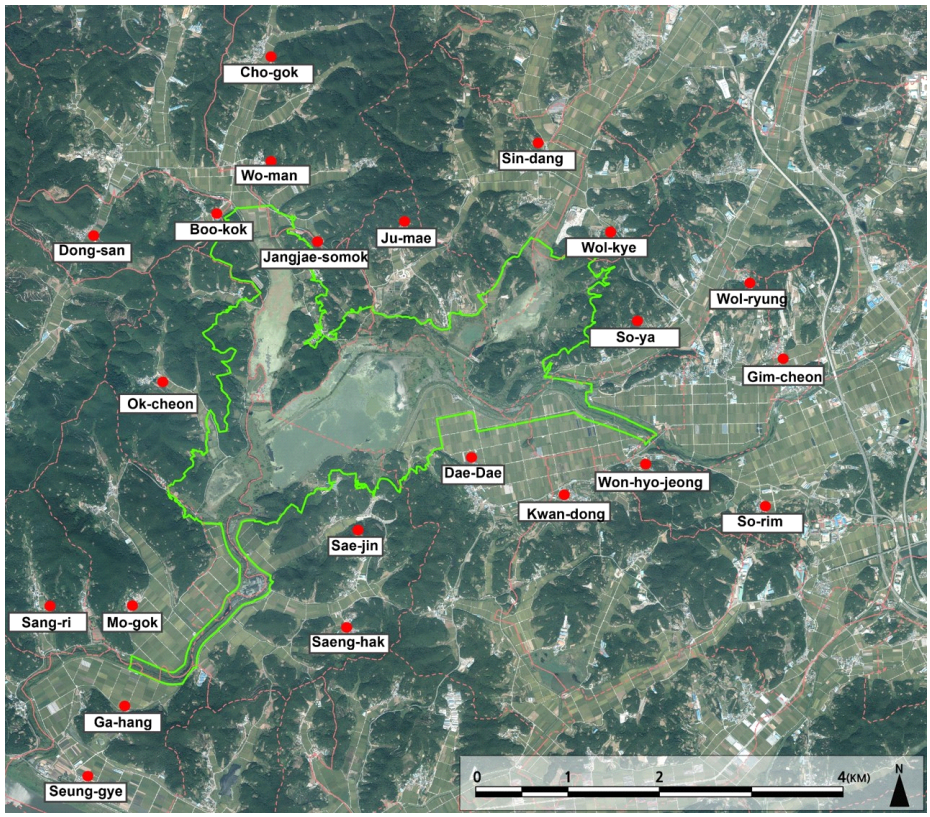
1) An ecotourism society sponsored by the government and operated by numerous organizations including four villages located near the wetland

2) Educational and Conservational Corporation



[Figure 3-1] Villages where interview was conducted

[Table 3-1] List of Interviewees with information

Village / Committee	Household / Residents	Responsibility	Name(Year of Birth, Gender)
Joomae	66/117	Community Leader	C. Roh(1962, M)
		Resident	S. Roh(1934, M)
Daedae	70/117	Community Leader	S. Han(1970, M)
		Resident	H. Ahn(1945, M)
Sindang	78/131	Community Leader	D. Park(1946, M)
		Resident	M. Song(1958, F)
Sejin	53/90	Community Leader	K. Sung(1946, F)
		Resident	C. Cho(1945, M)
Jangjae-Somok	42/74	Community Leader	Y. Sung(1958, M)
		Resident	C. Suk(1974, M)
Seunggye	66/129	Community Leader	K. Park(1959, M)
		Resident	O. Lee(1944, F)
Gahang	48/82	Community Leader	J. Lee(1968, M)
		Resident	Y. Hwang(1959, M)
Sangri	41/81	Community Leader	J. Gong(1964, M)
		Resident	H, Gong(1954, M)
Seokri	54/87	Community Leader	N/A
		Resident	T. Roh(1964, M)
Soyari	87/145	Community Leader	C. Kim(1962, M)
		Resident	S. Kang(1938, F)
Gimcheon	54/120	Community Leader	J. Bae(1961, M)
		Resident	K. Kim(1963, F)
Mogok	70/130	Community Leader	N/A
		Resident	S. Yang(1943, F)
Kwandong	60/115	Community Leader	D. Seok(1964, M)
		Resident	I. Lee(1952, M)
Sanghak	30/47	Community Leader	Y. Cho(1964, M)
		Resident	K. Sung(1935, F)
Wolgye	41/91	Community Leader	J. Yoon(1952, M)
		Resident	N/A
Bukok	28/71	Community Leader	H. Jin(1951, M)
		Resident	N/A
Wonhyojung	63/135	Community Leader	K. Sung(1970, M)
		Resident	K. Sung(1938, M)
Wolryung	35/64	Community Leader	Y. Yoo(1974, M)
		Resident	H. Ha(1937, F)
Chogok	61/106	Community Leader	T. Cha(1938, M)
		Resident	C. Kim(1927, F)
Uman	48/100	Community Leader	Y. Seok(1958, M)
		Resident	S. Lee(1942, F)
Okcheon	36/94	Community Leader	B. Cha(1957, M)
		Resident	J. Gong(1938, F)

The interview questionnaires were prepared as intelligible as possible for the convenience of residents to response with a better understanding of the interview purpose. The questionnaires consist of general concerns, problems and cognitions of the local residents toward 'Wetland conservation management', 'Ecotourism activities' and 'Upo wetland', which are the topics that have been mostly issued among researchers, government projects and news articles related to Upo wetland as shown in [Table 3-2].

[Table 3-2] Questions asked to the 41 residents from 22 villages

Topic	Question
Wetland conservation management	What is Wetland Protection Area to you?
	What do you think about on going conservation activities?
	What are the challenges for you to support current wetland conservation management?
	Is current wetland conservation management functioning?
Ecotourism activities	What do you think Ecotourism is?
	What do you think about other villages benefiting from ecotourism business?
	How well is ecotourism benefiting local community and environment?(only for villages that are involved in activities already)
	What are the challenges with Ecotourism?
	Do you wish the village you belong to could get involved in Ecotourism activities?
	Are you having any troubles with the tourists?
Upo wetland before and now	What is Upo wetland to you?
	Is/was the wetland benefiting your community ?
	How was/is your community related to Upo wetland?
	Do you cherish Upo wetland?
	Are there any challenges with Upo wetland?
	How has Upo wetland changed?

Each interview took about one to two hours as the interviewees recognized the

interviewer as an outsider. Furthermore, interviewees had difficulties focusing on each questionnaires due to health and impatience.

3.1.2. Challenges of the Communities Around the Wetland

There wasa broad range of responses regarding interview questionnaires. Although, more than half of interview responses included non-relevant personal requests and rumors. After carefully going through the interview contents, it was possible to verify issues and the communities' interest regarding wetland itself, wetland conservation and ecotourism activities.

3.1.2.1. Cognitions of the Interviewees Toward Upo Wetland Itself

As for Upo wetland itself, general concerns and problems of the wetland communities were identified as shown in [Table3-3].

[Table 3-3] General perception of 41 residents toward Upo wetland before and now

No.	%	Concern / Problem	Reason
1	100	Degradation of water quality	Unpleasant odor from the stream and edge of the wetland
			Fishery products from the stream and the wetland are no longer edible
			Pollutant entering Upo wetland
			Accumulation of dead plant materials slowing down the water circulation
			Stable water surface level indicating that water is not being circulated
2	97.6	Isolation of the communities and Upo wetland	Many native cultural activities at the wetland are no longer allowed(Grazing, Ice fishing, Water chestnut harvest, swimming and many others)
			How government views the residents as polluter of the wetland

92.7% of the interviewees described or remembered Upo wetland as 'lost treasure',

'mother nature' or 'natural amusement park' since the communities relied on the wetland as source of the necessities of life[3] for centuries. On the other hand, 100% of the interviewees responded negatively to current status of the wetland, which indicates that there have been significant changes in perception towards the wetland over time. Throughout the responses, it was found that 100% of the residents were concerned about water quality of the wetland as they realized the major changes of the water flow which was distracted by the overgrowth of the vegetations[4] along the streams entering the wetland. At the same time outside of the wetland protection area various non-point and point source pollution entered into the inner streams which accelerated the degradation of the water quality. Additionally, 97.6% of the interviewees felt isolated from the wetland as they were no longer allowed to freely enter the wetland despite of their strong attachment to the wetland since Upo wetland has been large portion of their livelihood for centuries.

3.1.2.2. Perceptions of the interviewees toward Ecotourism

90.2% of the 41 interviewees perceived ecotourism positively although diverse concerns and problems were included. In this perception analysis, interviewees are classified into two groups; group of 33 people from the villages that have not participated in ecotourism activities yet and a group of 10 participants; 8 people from four villages that are currently being operated as ecotourism villages and two experts[5].

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3) Use of the wetland for living; Food : Water chestnut(*Trapa natans* L.), carp(*Carassius carassius*), shellfish(*Anodonta arcaeformis* Heude), gastropod‘Go-doong’, Snake head(*Channa argus*) and fresh water eel(*Anguilla japonica*); Feed for grazing cows: Sedge(*Carex dimorpholepis*); Shelter for children to play around[Information was collected from the interview]

4) Bur cucumber(*Sicyos angulatus* L.), Buffalo weed(*Ambrosia trifida* L.), False acasia(*Robinia pseudoacacia*), Fragile willow(*Salix subfragilis* Andersson)

The [Table 3-4] below shows the results derived from the group of interviewees who are not involved in ecotourism activities. All the interviewees from non-ecotourism villages were not confident about not having enough attractions to initiate ecotourism by four general reasons, 93.9% of the interviewees were concerned about not having enough work forces to maintain ecotourism industry due to two reasons indicated in [Table 3-4], 84.8% of the interviewees were concerned about having no strategies no support to start ecotourism due to two reasons indicated in [Table 3-4] and 36.4% of the interviewees had negative impression on the behaviors of visitors as they threatened and distracted the residents.

[Table 3-4] General perception of 33 interviewees from non-ecotourism villages.

No.	%	Concern / Problem	Reason
1	100	Having no tourist attraction	Lives of the interviewees have been focused on onion and garlic cultivation only, hence, the interviewees never took surrounding environment into account as a resource
			Perceiving that the wetland is already contaminated therefore, there is not much of attraction
			Entry to wetland is restricted where most of the attractive cultural and natural resources belong to
			Believing that their community will not be as interesting as what four ecotourism designated villages which are already equipped, advertised and educated for tourism
2	93.9	Not having enough workforce	Most of the residents are used to cultivation and tend to avoid taking risks and efforts for initiating something new
			Aging population
3	84.8	Having no strategies nor support to start ecotourism	Having no opportunity to learn about the basic concepts and principles of ecotourism
			Believing that nothing is possible without the support of government
4	36.4	Visitors threatening or distracting the residents	Visitors blocking the main farm road during farming season
			Overnight fishermen contaminating the water stream by littering

The [Table 3-5] shows the responses of the group of 8 interviewees from ecotourism villages and two experts. Despite of being involved in ecotourism activities, two concerns were mentioned with numerous reasons in detail. All the

5) Director of Changnyeung-Upo-ecotourism INC. and Expert member of Ramsar wetland city accreditation board.

interviewees from this group mentioned that tourist attraction is still not enough due to seasonal, environmental and other reasons to meet satisfactions of visitors. The interviewees without two experts tend to care more of attraction of the natural beauty with goals to increase income rather than education and other necessary activities for the culture and environment. 90% of the interviewees were concerned about lacking community participation with four reasons, which strongly indicate that ecotourism development and their occupation are clearly neglected and the opinions of the ordinary citizen were excepted in the process of decision making.

[Table 3-5] General perception of two experts and 8 residents from the villages designated as Ecotourism destination

No.	%	Concern / Problem	Reason
1	100	Having not enough attraction for tourists	Exaggerated advertisement by the government
			Limited access to wetland resource
			Constructed attraction which does not fulfill the tourists' expectations
			Degradation of the wetland environment
			Tourism programs are only available during certain season of the year
2	90	Lack of community participation	Agriculture and aquaculture[6] are considered as priorities for living where as ecotourism is perceived to be a tool for supplementary income
			Majority of the residents do not understand the purpose of ecotourism, they only participate when there is a benefit to themselves
			Opinions of the residents tend to get declined where as the community leaders are only involved in decision making process
			Human resources of the village are missing as most of the financial supports from the government are used for facilities without planning community involvement.

3.1.2.3. Perception of the Interviewees Towards Wetland Conservation Activities

According to the interview contents, the interviewees understood the intention of

6)Jangjae-somok village is the only village with 13 registered fishermen

the conservation activities. Although, 100% of the interviewees disagreed with current maintenance policy and conservation activities as shown in [Table 3-6].

[Table 3-6] General perception of 41 interviewees toward Wetland conservation activities

No.	%	Concern/Problems	Reason
1	100	Releasement of Japanese Crested Ibis	Not confident about ensuring the life of Japanese Crested Ibis with current inorganic farming methods being practiced
2	92.7	Prohibition on entering wetland	Taking away the authorities, memories, culture, resources for living from residents
			Increasing numbers of fisherman contaminating the streams entering into the wetland protection area
			Accumulation of dead plant materials slowing down the water circulation as resources of the wetland were no longer used.
3	90.2	preservation of water surface level	Limiting usage of wetland water for farming
			Decreasing frequency of water circulation resulting in degradation of the water quality
4	87.8	Land purchase project within wetland protection area implemented by the government	Decreasing value of the lands adjacent to the protection area
			Irrigation system and roads are connected to the land inside the protection area and are left fallow as bare land therefore the irrigation system frequently gets clogged during the rainy season
			Providing habitats for invasive animals and weedy plants to get spread around
6	36.6	Prohibition of hunting	Increasing numbers of invasive animals damaging farmland

It was found that all the interviewees suffered from severe stress caused by 'Japanese Crested Ibis Restoration Project'[7] as their cultivation method required great

7)Managed by Ministry of Environment and Changnyeong-gun city since 2008

amount of herbicide and pesticide, which have resulted in death of migratory birds previously. 92.7% of the Interviewees had complaints about prohibition on entering wetland which they felt conservation activities were taking away their authorities, memories, culture and resources from the community and accelerating degradation of the wetland environment. 90.2% of the interviewees were concerned about preservation of water surface level as only limited amount of wetland water was allowed for farming during the dry season of the year and decreasing frequency of water circulation resulted in degradation of the water quality. 87.8% of the interviewees were concerned about the land purchase project within wetland protection area implemented by the government as purchased lands cause problems related to irrigation and road. It resulted in depreciation of the land value that are adjacent to the protection area. Lastly, 36.6% of the interviewees were concerned about prohibition of hunting due to increasing number of invasive animals on the farmland.

As a result, 13 concerns of the communities were identified, which were strongly related to both economic activities of the communities and wetland environment as shown in [Table 3-7]. Such results indicate that existing management and planning for the communities and the wetland are not functioning as residents were concerned and stressed about both environment and the communities for long periods of time. This result shows that local residents' opinions based on local knowledge and experience have been lacking in decision making process.

[Table 3-7] General concerns derived from the interview

No.	People	Concern/Problems	Wetland Env't	Economic Activities
1	41	Releasement of Japanese Crested Ibis		●
2	41	Degradation of water quality	●	
3	41	Having no tourist attraction	●	●
4	40	Isolation of the communities and Upo wetland	●	●
5	39	Not having enough workforce		●
6	38	Prohibition on entering wetland	●	●
7	37	preservation of water surface level	●	●
8	36	Land purchase project within wetland protection area implemented by the government	●	●
9	28	Having no strategies nor support to start ecotourism	●	●
10	15	Prohibition of hunting	●	●
11	12	Visitors threatening or distracting the residents	●	
12	10	Having not enough attraction for tourists	●	●
13	9	Lack of community participation	●	●

3.1.3. Settings and Classifications of Mapping attributes

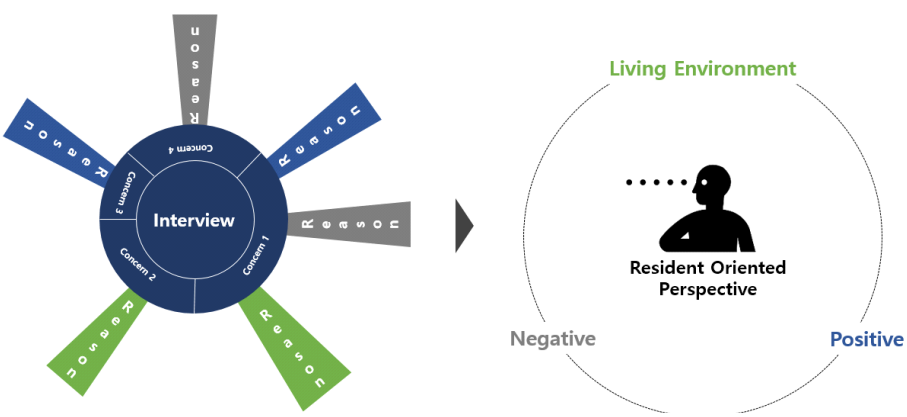
Mapping items are crucial for successful cognitive mapping as the quality of cognitive maps depend on how well participants understand the importance and intention of the mapping items. Furthermore it is important for researcher to be in a strong rapport with participants in order to assist participants to commune with the mapping items and geographically visualize their local knowledge. Therefore, the mapping items need to be carefully selected with consideration of residents' perceptions regarding research interests.

The purpose of the cognitive mapping in this study is to identify areas based on perception of the residents toward surrounding environment for planning sustainable ecotourism. Therefore, this subsection of the study consists of 3 steps; selecting and classifying mapping items for active participation of the residents during the mapping process with residents oriented perspectives and identifying suitable areas for

sustainable ecotourism with ecotourism oriented perspectives. First step is to select and classify mapping items related to the issues derived from the previous interviews with residents oriented perspective. Second step is to reclassify each mapping items based on the concept and principles of ecotourism covered in Chapter 2.2. Third step is to set standard settings of cognitive map to decide which area are perceived by the residents importantly.

3.1.3.1. Selection and Classification of Mapping Items with Residents Oriented Perspective

The reasons of residents' concerns derived from the interview were taken into consideration in the process of preparing mapping items as their reasons may have developed from individual's sense of place[8]. The mapping items are classified into 'Positive cognition', 'Negative cognition' and 'Living environment' in order to verify existing problems and potential responses by the residents as shown in [Figure 3-2].



[Figure 3-2] The principle of classification of mapping items with resident oriented perspective

8) G.Brown(2001) rephrased the meaning of 'sense of place' explained by D. Williams(1998) that 'Sense of place is referred as a type of attachment or emotional bond people develop with a place and may strongly felt values, meanings and symbols about a place that often surface when the qualities of a place are threatened'.

Positive cognitive mapping items

It was found that there were 37 reasons of residents' concerns regarding 'Ecotourism', 'Upo wetland' and 'Conservation activities'. By going through the reasons for their concerns, it was possible to grasp the needs and problems of the communities. Positive cognitive mapping items are focused on finding areas of great opportunities or potential to support the diverse needs of the communities, which may benefit the communities culturally or economically. The positive mapping items are shown in [Table 3-8].

[Table 3-8] Selected Positive Cognitive Mapping Items

No.	Mapping Items
1	Ancient paths, daily walking trail
2	Areas where interesting or native plants and animal are spotted.
3	Areas with great memories or great view point
4	Areas where edible plants exist
5	Areas where dynamic water fluctuation is visible
6	Areas where stream is physically approachable

Positive cognitive mapping items are selected with an intention to provide opportunities for participants to recognize the great value of resources around their communities. Mapping item No. 1-6 may give a great potential for ecotourism activities as No. 1, 3, 5 and 6 could support cultural value of the communities and No.1-6 provides natural experiences with community involvement which may economically benefit the communities.

Negative cognitive mapping items

Negative cognitive mapping items are selected based on the concerns of the

interviewees which are related to water quality, inconvenience of the road, littering and invasive animals. The intention of negative cognitive mapping items is to help participants to realize the areas exposed to contamination, which need improvement and better management.

[Table 3-9] Selected Negative cognitive mapping items

No.	Mapping Items
7	Where invasive animals appear
8	Roads where maintenance or restriction is needed due to motor vehicles of visitors, littering, erosion, landslide, flooding
9	Where unpleasant odor is sensed or caused
10	Where stream flow is distracted due to accumulation of dead plants or wastes
11	Where fishermen frequently camp and litter
12	Where degradation of the wetland can be observed

Living environment mapping items

Living environment mapping items are selected with numerous intentions as shown in [Table3-10]. Firstly, to identify areas that play important role for maintaining the livelihood of the communities. Secondly, to understand the overall status of the farmland, cultivation practices and water system in order to find water polluting factors and solutions for improvement of the water being pumped into the wetland. Thirdly, to identify areas for making an attempt to cultivate alternative cash crops that are more environmentally friendly rather than current cultivation. Fourthly, to identify where point source pollution from the livelihood including livestock farm is being released. Last and most importantly, to wake awareness of the participants toward the fact how their life style could contribute to the wetland environment either positively or negatively.

[Table 3-10] Selected Living environment mapping items

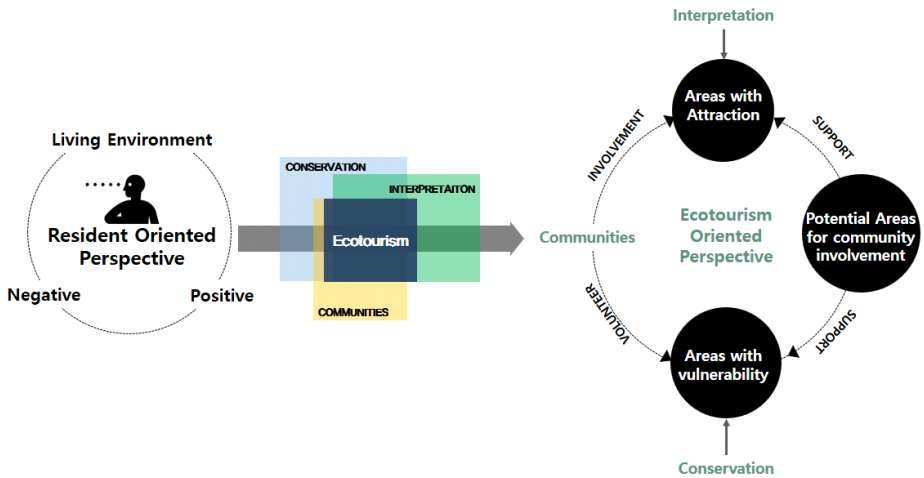
No.	Mapping Items
13	Plots suffering from water deficiency
14	Place where they pile manures for farming
15	N/A
16	Plots with low yield due to poor water infiltration.
17	Plots that require excessive amount of herbicides or pesticides
18	Plots that are left fallowed
19	Plots where crops are cultivated other than garlic or onion
20	Flow direction of irrigation system and drainage
21	Place where the drainage water is released from the farmland
22	irrigation system with problem
23	Farm road with inconveniences
24	Main farm road
25	Farm road where visitors tend to distract farmers
26	Place where livestock farm and the numbers
27	How domestic waste water is released(directly to the wetland or through wastewater treatment)
28	Place where incinerate the trash inevitably
29	Recommendable place among 4 villages for establishment of visitor center

Overall, 29 mapping items are selected based on the concerns and opportunities derived from the interview with 41 residents. Mapping items with resident oriented perspectives are to be used as fundamental factors when applying cognitive mapping.

3.1.3.2. Selection and Classification of Mapping Items with Ecotourism Oriented Perspective

29 mapping items selected and classified with resident oriented perspective shall be crucial for geographically visualizing how residents perceive the research site. However, throughout the interview, it was found that majority of the residents did not have a clear concept of ecotourism. Therefore, geographical visualization of the perception of residents for planning ecotourism all at once is challenging. To overcome such limitation, the mapping items are reclassified into three groups developed from the conceptual pillars supporting the term 'Ecotourism' which are

known to be 'Interpretation', 'Communities' and 'Conservation'[9]. Three groups developed from the conceptual pillars of ecotourism are 'areas with attraction', 'areas with vulnerability' and 'potential area' as shown in [Figure 3-3].



[Figure 3-3] Transition of perspective based on conceptual pillars supporting Ecotourism

Each group plays an important role as the group 'Areas with attraction' will contribute to interpretation while benefiting the community with varieties of tourist attraction with community involvement, the group 'Areas with vulnerability' will contribute to conservation while improving the quality of the environment by enhanced management and monitoring. Lastly, the group 'Potential area' will contribute to communities while playing its role as supplementaries for both 'Areas with attraction' and 'Areas with vulnerability' for enhancing community involvement and conservation.

Although, direct application of three groups developed from conceptual pillars supporting ecotourism is challenging since the concepts contains wide range of

9) The International Ecotourism Society(2015)(http://www.ecotourism.org/) Accessed on: 2016. 12. 07

meanings. Therefore, 21 principles supporting the concept of ecotourism suggested by Wallace (1996), TIES (2015) and Honey (2008), which were mentioned in Chapter 2 are used for reclassification as shown in [Table 3-11] and [Table 3-12].

[Table 3-11] Reclassification resident oriented perspective to ecotourism oriented perspective through application of the conceptual pillars

	No.	Mapping Item	CONSERVATION (Area with Vulnerability)													COMMUNITY (Potential Area)									INTERPRETATION (Area with Attraction)							Tendency
			W1	W3	W5	T1	T2	T4	T6	T7	T8	H2	H4	H6		W4	W5	W6	T3	T5	T8	H5	H6	H7		W2	W6	T2	T3	T6	H1	H3	
Positive	1	Ancient paths, daily walking trail	●	●	●	●		●	●	●	●		●	●		●		●	●		●		●			●	●		●	●	●	●	Conservation & Interpretation
	2	Interesting or native plants and animal are spotted.	●		●	●	●	●	●	●	●		●	●		●		●	●		●		●			●	●	●	●	●	●		Conservation & Interpretation
	3	Great memories or great view point	●		●	●	●		●	●	●			●		●		●	●		●		●			●	●	●	●	●	●	●	Conservation & Interpretation
	4	Areas where edible plants exist	●		●	●				●								●	●							●	●		●	●	●	●	Interpretation
	5	Dynamic water fluctuation is visible				●		●	●									●	●							●	●	●	●	●	●	●	Interpretation
	6	Stream is physically approachable					●		●	●								●	●							●	●	●	●	●	●	●	Interpretation
Negative	8	Roads in need of maintenance or restriction	●			●	●		●	●		●		●																			Conservation
	9	Unpleasant odor is sensed or caused	●	●		●	●		●			●					●						●	●			●		●		●		Conservation
	10	Stream flow is distracted due to accumulation of dead plants or wastes	●	●		●	●		●			●																●		●		●		Conservation
	11	Fishermen frequently camp and litter	●	●	●	●	●	●	●			●	●			●	●	●	●			●	●	●				●		●		●		Conservation & Community
	12	Degradation of the wetland can be observed	●	●		●	●	●	●	●		●	●															●		●		●		Conservation

W1-6: Principles of Ecotourism proposed by Wallece(1996); T1-8: Principles of Ecotourism proposed by TIES(2015); H1-7: Principles of Ecotourism proposed by Honey(2008); C: Conservation; CM: Community; IN: Interpretation; Blue(Fill): Mapping items selected for Conservation; Green(Fill): Mapping items selected for Interpretation; Yellow(Fill): Mapping items selected for Community

[Table 3-12] Reclassification resident oriented perspective to ecotourism oriented perspective through application of the conceptual pillars(Continued)

	No.	Mapping Item	CONSERVATION (Area with Vulnerability)												COMMUNITY (Potential Area)									INTERPRETATION (Area with Attraction)							Tendency
			W1	W3	W5	T1	T2	T4	T6	T7	T8	H2	H4	H6	W4	W5	W6	T3	T5	T8	H5	H6	H7	W2	W6	T2	T3	T6	H1	H3	
Living Environment	13	Suffering from water deficiency							●																			●			N/A
	14	Pile manures for farming	●	●		●	●			●		●														●					Conservation
	16	Low yield due to poor water infiltration.													●	●	●	●	●	●	●	●	●								Community
	17	Require excessive amount of herbicides or pesticides	●	●		●	●				●	●			●	●	●		●	●	●				●	●					Conservation & Community
	18	Left fallowed field			●			●							●	●	●	●	●	●	●	●	●		●						Community
	19	Crops other than garlic of onion are cultivated			●			●		●					●	●		●	●		●	●	●		●						Community
	20	Flow direction of irrigation system and drainage																													N/A
	21	Drainage water is released from the farmland	●	●		●	●		●	●		●			●						●	●				●		●		●	Conservation
	22	Irrigation system with problem																													N/A
	23	Farm road with inconveniences				●								●	●		●	●		●	●	●	●	●	●		●		●	●	Community & Interpretation
	24	Main farm road								●				●																	N/A
	25	Farm road where visitors tend to distract farmers				●				●																					N/A
	29	Recommendable place for establishing visitor center									●				●		●	●		●		●									Community

W1-6: Principles of Ecotourism proposed by Wallece(1996); T1-8: Principles of Ecotourism proposed by TIES(2015); H1-7: Principles of Ecotourism proposed by Honey(2008); C: Conservation; CM: Community; IN: Interpretation; Blue(Fill): Mapping items selected for Conservation; Green(Fill): Mapping items selected for Interpretation; Yellow(Fill): Mapping items selected for Community

3.2. Cognitive mapping

In section 3.2, the perceptions toward environment regarding remarkable issues within research site are geographically visualized by 19 residents with an application of cognitive mapping. The cognitive map is created based on ecotourism oriented mapping items derived from section 3.1. The mapping items are grouped into three types of area for ecotourism planning; area with an attraction, area with vulnerability and potential area for ecotourism. The existing resources and vulnerable factors determining characteristics of each type of areas are verified and discussed.

3.2.1. Preparation, Process and Participants

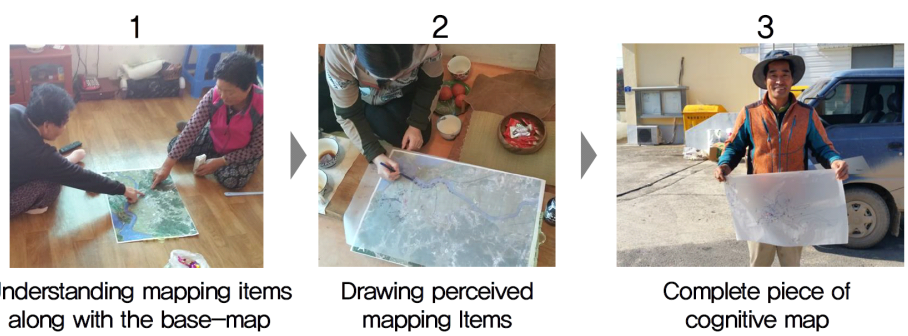
3.2.1.1. Preparation

The mapping precess begins with preparation of the materials. In this research, 3 copies of A2 size base map, 3 different colored pens, stacks of A2 size tracing papers, survey sheet including list of mapping attributes, paper clips, voice recorder and cell phone need to be prepared for cognitive mapping with residents. Reason for having 3 copies of base map was to be prepared for the time when more people are willing to join at the same time. The tracing paper was prepared for participants to draw over the map and it is important to make sure the paper is thin enough to see-through. With the list of 29 mapping items to be drawn over one tracing paper, it may be a challenging task to keep track of all the lines and polygons drawn by the participants. As a solution, 3 different colored pens were used to represent each mapping attributes, which are 'positive', 'negative' and 'living and working environment'. The cell phone was used frequently as the participants had difficulties to match the name and the look of living organisms. Further more the pictures taken from the previous field investigation helped participants to understand the base map.

Making an appointment with participants in advance is crucial especially during the farming season of the year. Most appointments were held during the rainy day and evenings of the sunny day, when it was impossible for the participants to go out for farming. The requests for participation were most likely to get denied before the rain fall as the farmlands take lots of preparation for the rainfall, said by most of the participants.

3.2.1.2. Mapping Process

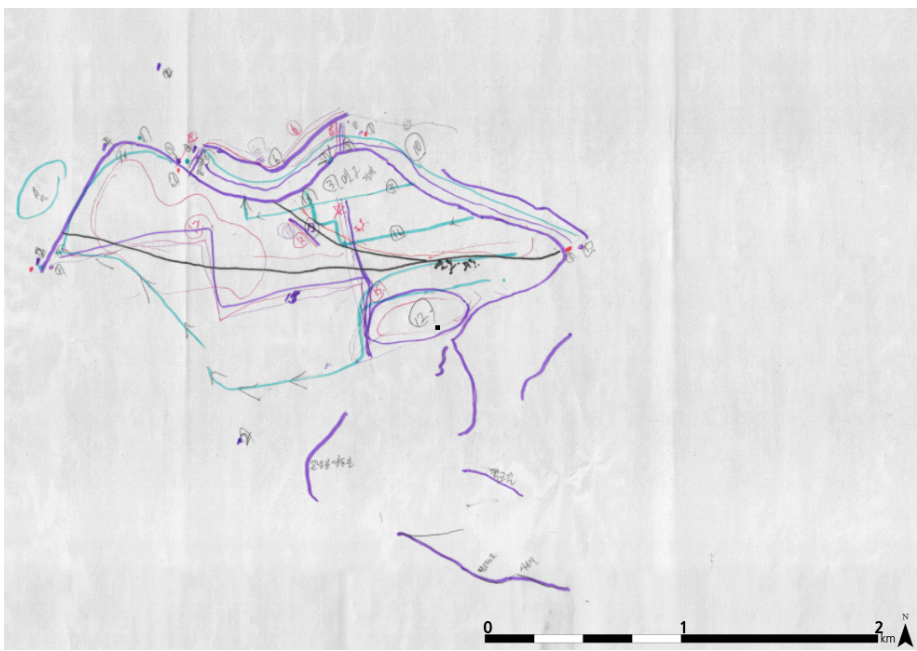
The cognitive mapping was conducted on different days and the mapping process took 40 to 80 minutes per participant depending on the capability of each participant to understand the base-map. Prior to start mapping the purpose of the research was explained to the participants. The participants showed their interest in mapping items as the mapping items were prepared with an intention to solve general concerns of the communities as shown in [Figure 3-4].



[Figure 3-4] General process of cognitive mapping with involvement of residents

After introducing cognitive mapping survey, the participants were given with materials prepared and asked to draw either lines or polygons regarding each mapping items. While going through 29 mapping items, the participants had rights to

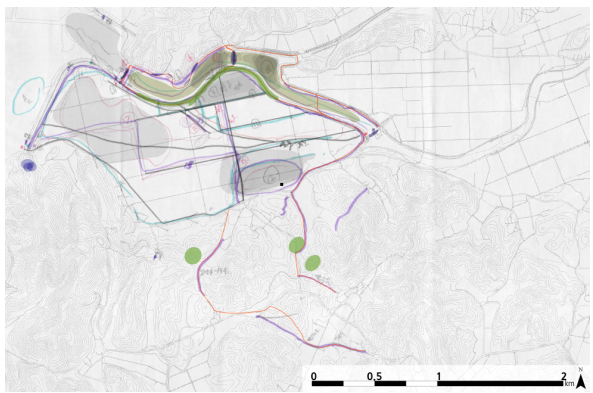
skip the items. 10 out of 19 participants participated individually, a group of 3 participants conducted cognitive mapping together and 3 groups of 2 participants conducted cognitive mapping together. Although, without the guide by the researcher, most of the participants had difficulties to point out the specific area of their interest and participate in cognitive mapping. Therefore it was best for the researcher to implement cognitive mapping with one participant at a time. [Figure3-5] shows one of the result of cognitive mapping in early stage.



[Figure 3-5] Result of cognitive mapping in early stage created by one of the participant over the tracing paper

In [Figure 3-5] lines drawn in three different colors can be seen, which helps the researcher to differentiate each mapping attributes of 'negative', 'positive' and 'living environment'. Furthermore, the lines and polygons were coded with numbers representing each mapping items. The A2 size tracing paper with drawings were

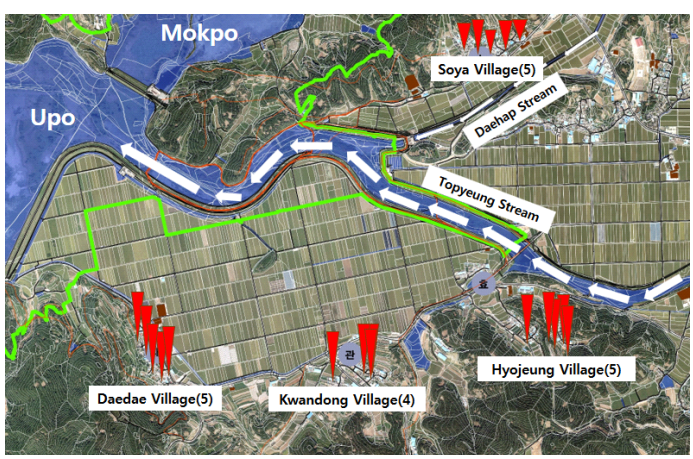
digitalized with rolling scanner, then all the lines and polygons were digitalized and coded as shown in [Figure 3-6] for overlapping analysis.



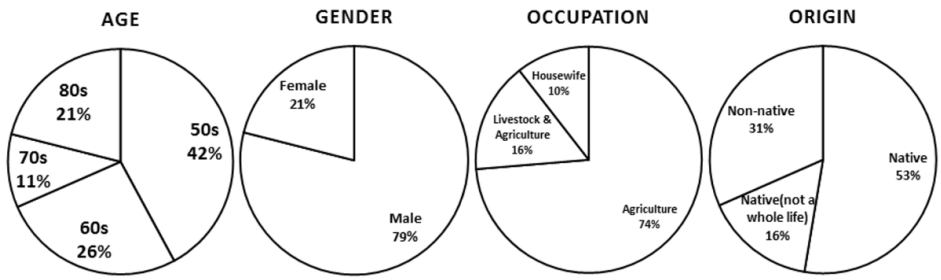
[Figure 3-6] The digitalizing process of drawings for further analysis

3.2.1.3. Participants

There are 4 villages in a research site and total number of 19 residents consisting of 4 to 5 residents, including community leader from each villages participated in cognitive mapping as presented in [Figure 3-7]



It was found that 79% of the participants were male and 21% of the participants were female, 42% of the participants were in their 50s, 26% of the participants were in their 60s, 21% in their 80s and 11% in their 70s. Further more 74% of the participation were involved in agriculture only, 16% of the participants were involved both in livestock farm and agriculture and 10% of the participants had no occupation. 69% of the participants were born in Upo wetland communities and 31% of the participants moved to Upo wetland at least 20 years ago. The proportion of the basic information is shown in [Figure 3-8].



[Figure 3-8] Basic information of participants

3.2.2. Results

3.2.2.1. Areas with Attraction

Areas with attraction is an important factor for activating ecotourism as the area is intended to provide natural and cultural experiences for visitors with involvement of the communities to provide varieties of services while gaining profit. Within 'Areas with attraction' different ways of gaining experience were considered. The experience could be gained through 5 senses[10] by education, recreational activities or just a simple stroll. In this paragraph of the study, suitable areas for both education and recreational activities are selected referring to the mapping attributes[11]

10) sense of seeing, hearing, smell, taste and touch
11) 'Positive', 'Negative' and 'Living environment'

classified in section 3.1 as shown in [Table 3-13] below.

[Table 3-13] Selected mapping items for Areas with attraction

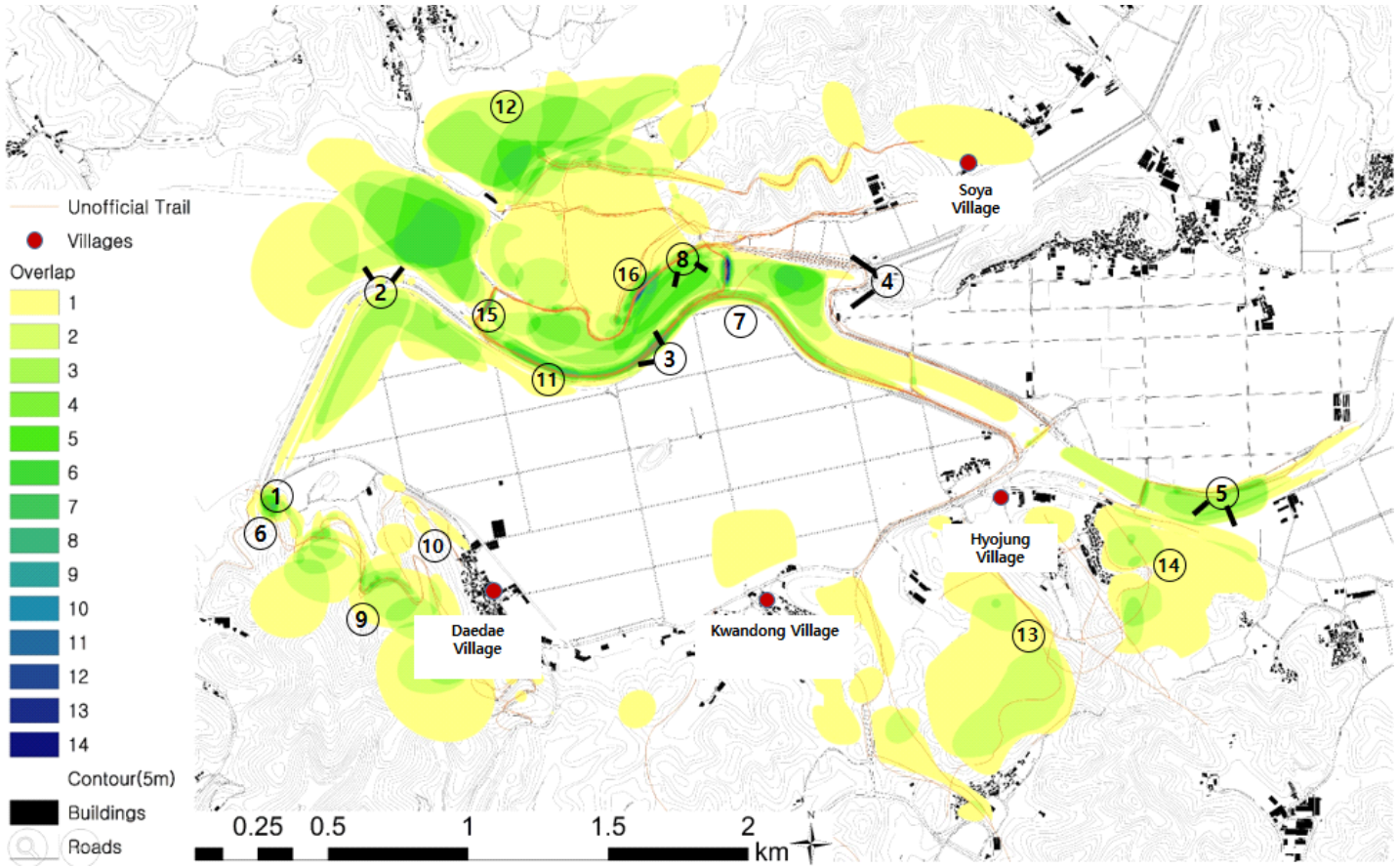
No.	Selected Mapping Items	Number of Responding Participants
1	Ancient paths, daily walking trail	19
2	Areas where interesting or native plants and animal are spotted(Fauna : Otter, Marten, Bean goose, Spoon bill, Eagle, Swan and others. Flora : Willow tree, Gorgon plant, Frogbit, Sedge, reeds and others)	18
3	Areas with great memories or great view point	19
4	Areas where edible plants exist	16
5	Areas where dynamic water fluctuation is visible	9
6	Areas where stream is physically approachable	15
23	Farm road with inconveniences	6

There are total of 7 cognitive mapping items regarding areas with attractions. Except for mapping item No. 5 and 23, the participants showed active involvement in the process of mapping, since they have experienced multiple traumatic floods especially the flooding caused by the typhoon 'Maemi' in 2003 and constant distraction on the main farm road during harvesting time[12] of the year. Majority of cognitive maps were found to be concentrated along the stream, inside the wetland, forest and farmland within 'wetland protection area'.

Mapping item No. 1, 2, 3, 4, 5 and 6 are selected for both education and recreation as all the mapping items provide varieties of opportunities for fulfilling 5 different senses. Item No. 1 would provide trails to experience item No. 2, 3, 4, 5, 6 and 23. Item No. 2 provides opportunity to experience natural resource with sense of seeing, hearing, smelling and touching. No. 3 provides opportunity to learn and enjoy the nature and culture by sense of seeing. No. 4 provides opportunity to experience edible plants with sense of seeing, tasting, smelling and touching. No. 5 provides opportunity for education about the hydrological process of the stream with

12) Sowing season of onion and garlic in the area is between late september and early october which is the peak season for visitors as well.

sense of seeing, hearing and smelling. No. 6 provides opportunities for recreational activities and education by experiencing the stream environment. No. 23 was selected since this mapping item provides opportunity to stroll through the field of garlic, onion, rye and rice as an attraction, which may sustain the livelihood of the residents. The cognitive map of 'Area with attraction' with overlapping layers and significant areas are numbered over the map as shown in [Figure 3-9] for further explanation.

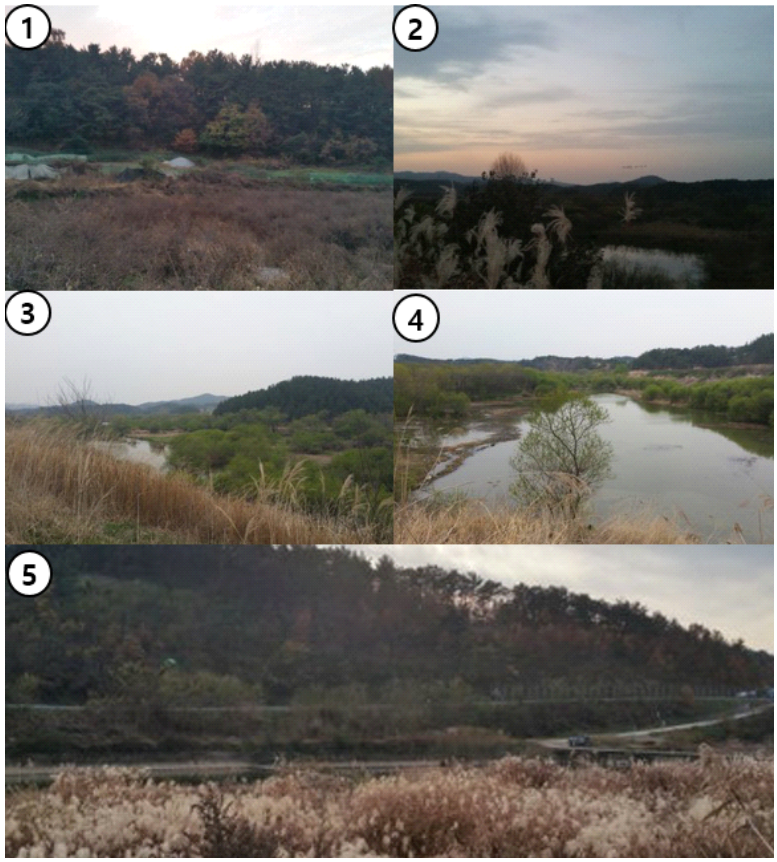


[Figure 3-9] Cognitive map of Area with Attraction

The numbered areas in [Figure 3-9] are field investigated and explained in following paragraphs.

Old trail or trail being used on daily basis were asked to initiate cognitive mapping process as a first mapping item, which was expected to play an important role as an indicator of the perception of participant by relating surrounding areas of the trail to other mapping items. Participants from different villages were more likely to show the trails near their area as they grew up on the trail as shown in [Figure 3-10]. It was found that old trails used to connect the villages around the wetland. Almost 50% of trails have not been used due development of transportation and restrictions placed by designation of wetland protection area. Although, the participants had strong place attachment to the old trails as they spent most of their childhood on the old trails. Most of old trails were in forms of forest trail along the contours. Furthermore, the bridges and roads across or along Topyeung stream have been used mostly over time as the stream provided necessities for livelihood of the communities.

Areas where interesting or native plants and animals are spotted are described with following [Figure 3-10]. Point 1 is the picture of small hill in where residents of Daedae village used to harvest acorns and kudzu vine for living. Point 2 shows the place where both most migratory birds and permanent residents could be seen the most. Point 3 and 4 shows the colonies of willow tree where varieties of birds and other animals are heard. Point 5 shows the field of reeds.



[Figure 3-10] Natural attraction perceived by the residents

Regarding [Figure 3-11], point 8 is located at meandering part of Topyeung stream, where participants had great memories of spending time in their childhood swimming, bringing cows for grazing, harvesting wild plants and resting on a sand dune as shown in [Figure 3-11]. Numerous viewpoints were revealed by the participants and were located on peak of the hill most of the time as shown in [Figure 3-11]. Varieties of recreational activities such as ice skating and tracking were discussed with participants although they were cautious about the idea of doing old activities, since they have been under the stress caused by varieties of

conservation activities. Point 6 in [Figure 3-11] is a recommended view point by all the participants from Daedae village, which was a part of the ancient path. Although the participants were sure that the path and view is occupied with overgrowth of the forest since there have been no reasons to use the old path recently. Point 7 is another view point recommended by two participants from Kwandong village, where panoramic view of Topyeung stream could be seen.

[Figure 3-11] Views from the view points recommended by participants

16 out of 19 participants could locate where edible plants exist. Despite the number of responses were high, the frequency of areas being overlapped was low as the size of place for harvesting berries or herbs were limited, varieties of the plants existed and each participants preferred the place near their residence. [Table 3-13] shows the information regarding the location of edible plants, which are indicated in [Figure 3-9].

[Table 3-13] Selected Negative cognitive mapping items

Point	Name	Scientific name	Use	Harvesting Season
9, 12, 13, 15	Acorn	*Quercus acutissima*	Use the fruit for Jellied food	November
11	Mugwort	*Chrysanthemum coronarium*	Use the leaf and stem as ingredient for soup, side dish and tea	January-March
10	Black nightshade	*Solanum nigrum* L.	Limited amount of fruits are edible and use the leaf for medicinal purpose	October-Novmber
10	East Asian arrow root	*Pueraria lobata*(Wild)	Medicinal purpose and tea	April & November
12	Korean mulberry	*Morus bombycis*	Fruits and young leaves are edible	June-July

Source : Contents derived from the interview

[Figure 3-12] shows the moment of edible plants being introduced by the resident of Daedae village. The resident insisted that only limited amount of fruits should be consumed for medical purpose since some fruits are poisonous.

[Figure 3-12] Resident of Daedae village introducing the fruit of the 'Black night shade'

Edible plants provide great opportunities for visitors to experience the nature along with wetland on the other hand. It could be a threat to the visitors, because there are great number of poisonous and undistinguishable plants in nature. Therefore, it is best for the visitors to be guided by residents since the visitors are not aware poisonous plants such as 'Black night shade'. As the villages have good accessibility to the source of the edible plants. There are possibilities of using the resources and its relation to the villages for seasonal ecotourism programs with involvement of the belonging communities.

Places providing opportunities to experience and learn about the stream (Mapping Item No. 5 and 6) were discovered with perception of the residents. Two submerged bridges resulted in highest frequency of overlapping polygons of 10, which is shown in [Figure 3-9] above. The submerged bridges were built in 1974, until then, foot bridge existed next to current submerged bridges for ages. The participants had a strong place attachment to the stream with their water crossing experience on bare foot. During the process of cognitive mapping, the residents actively explained the changes of the stream and daily sceneries of the stream as shown in [Figure 3-13]. Most participants had a great understanding of hydrological process, changes of the vegetation and water quality of the stream and the wetland. This proves that there are great opportunities to learn about lost cultures, and changing environment of the stream with participation of the residents.

[Figure 3-13] View from the place chosen by the residents for experiencing the stream

There are total of 7 cognitive mapping items regarding areas with attractions. Except for mapping item No. 5 and 23, the participants showed active involvement in the process of mapping. Overall, the greatest number of overlapping layer was found to be 14 as shown in [Figure 3-8]. Majority of overlapping layers of 'Areas with attraction' appeared to be along the stream, inside the wetland, forest and partially farmland within 'wetland protection area'.

3.2.2.2. Areas with Vulnerability

Areas with vulnerability is an important factor to be considered when planning ecotourism. The areas with vulnerability potentially have negative impacts on sustainabilities of the natural and cultural environment or could be an area with great natural or cultural values that may be exposed to numerous threatening factors. Therefore, better management is required as soon as possible while considering the livelihood of the residents. The mapping items for areas with vulnerability are derived from section 3.1 as shown in [Table3-14] below.

[Table 3-14] Selected mapping items for Areas with vulnerability

No.	Selected Mapping Items	Number of responding participants
1	Ancient paths, daily walking trail	19
2	Areas where interesting or native plants and animal are spotted(Fauna : Otter, Marten, Bean goose, Spoon bill, Eagle, Swan and others. Flora : Willow tree, Gorgon plant, Frogbit, Sedge, reeds and others)	18
3	Areas with great memories or great view point	19
9	Where unpleasant odor is sensed or caused	7
10	Where stream flow is distracted due to accumulation of dead plants or wastes	10
11	Where fishermen frequently camp and litter	6
12	Where degradation of the wetland can be observed	7
14	Place where they pile manures for farming	5
17	Plots that require excessive amount of herbicides or pesticides	1
21	Place where the drainage water is released from the farmland	8

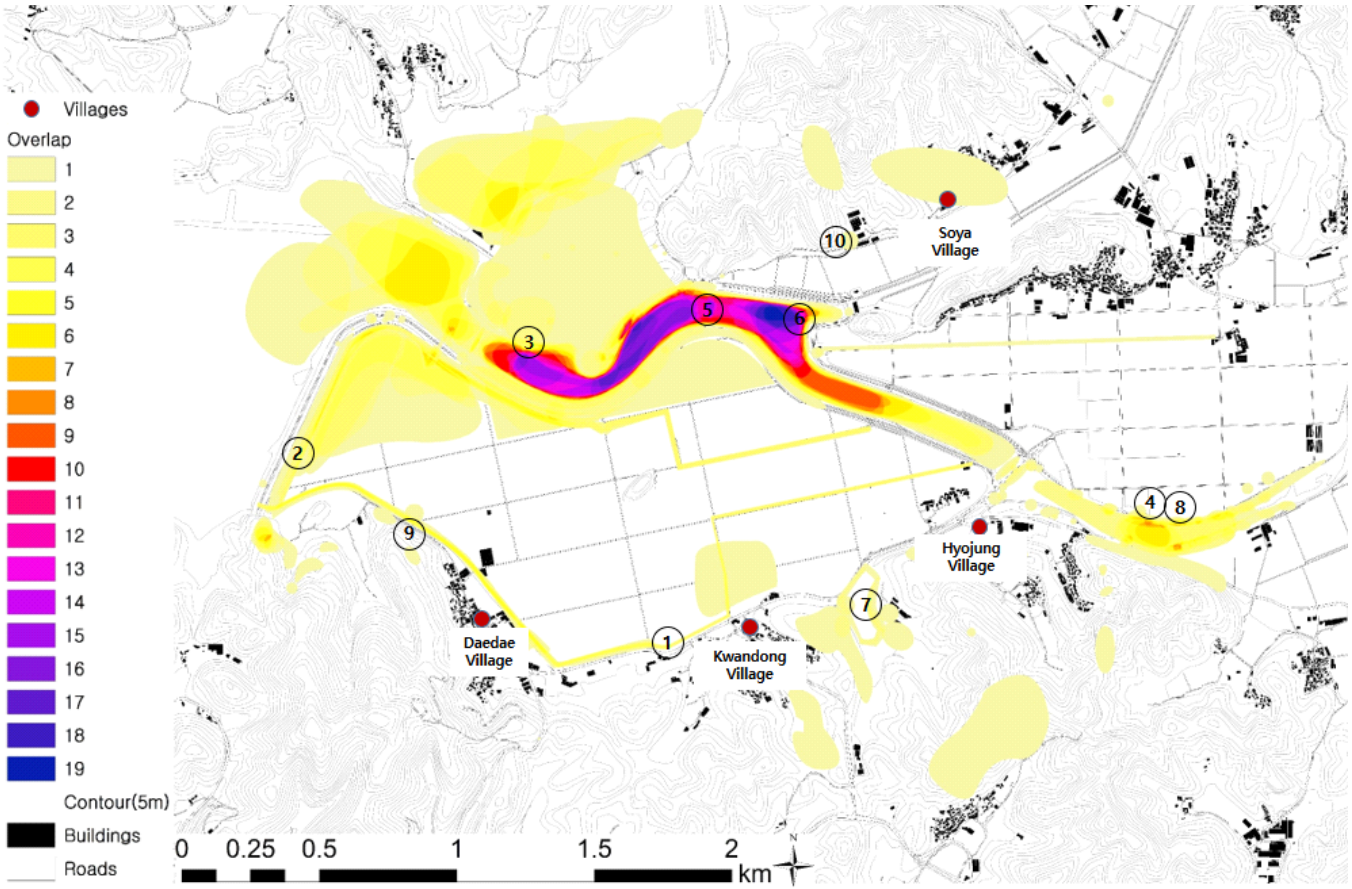
There are combinations of 3 positively perceived mapping items, 4 negatively perceived mapping items and 3 living environment related mapping items used to delineate areas with vulnerability. No. 1, 2 and 3 were chosen, since the items consists of great natural and cultural values perceived by the residents, which need to be maintained with better management with involvement of belonging communities. All the items from negative mapping attribute except No. 7 and 8 are selected since No. 7 is a part of natural environment and No. 8 does not threat the environment. Items other than No. 7 and 8 plays an important role as they delineate the degrading area as the areas mapped with each items have been threatening factors to the communities. The areas related to the negative mapping attribute require intensive management with a support from government and involvement of the communities and volunteers. No. 9 is chosen, because the odd odor is a sign of contaminants being accumulated, which may potentially degrade or extend the wetland quality. Area related to mapping item No. 9 needs improved management or restoration, if

the area is necessarily needed for water quality with frequent monitoring especially if the area has a direct hydrological connection with the wetland. No. 10 is chosen andrelated to No. 9 since distracted stream flow will eventually give off odd odor, especially if it is exposed to point or non-point source pollution or the stream is not built in natural form. Areas related to No. 10 needs intensive management or restoration, if the areas needs to keep the water flow, which may require communities and volunteers involved monitoring and management. No. 11 is chosen as areas related to No. 11 have been a major issue to specific communities located near the stream. Since the fishing activities are allowed outside of wetland protection area, there have been great number of fishermen causing serious litter problem as communities have no rights to ban fishing activities. No. 11 indicates that the place may potentially become permanent point source pollution unless the place is managed in right way. No. 12 is chosen as the degradation of the stream or wetland environment is clearly perceived by the participants, such areas could be used for frequent monitoring with community or volunteers involved.

Areas related to mapping item No. 14, 17, 21 and 27 were selected. No. 14 could be a threat to stream of wetland environment, especially if located near the areas hydrologically connected to the stream entering the wetland. No. 17 could be a threat to the wetland with non-point source pollution, even though only one participants have marked the area, which is disqualifying to be a problem. No. 21 and 27 could be a threat to the stream if the waste water not filtered through treatment while having a hydrological connection to the wetland.

Overall, the participants showed active involvement for positive mapping items, where as low involvement was observed when asked to draw areas for mapping items related to negative perception and living environment. Although, the mapping items with small number of participants showed comparable precision, where as

perception of mapping items are widely distributed. The cognitive map of 'Area with vulnerability' with overlapping layers and significant areas are numbered over the map as shown in [Figure 3-8] for further explanation.

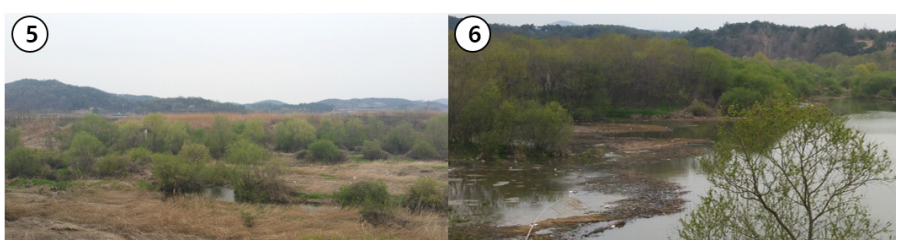


[Figure 3-14] Map of Area with Vulnerabilities

Regarding mapping item No. 9, point 1(9) in [Figure 3-14] above indicates where the waste water from Kwandong village joins with drainage canal that gets pumped out to Topyeung stream. Point 2(10) is the line of canal that delivers the waste water from farmland and livelihood to the drainage facility, which is obvious that the area would give off the odor as the water is kept most time of the year except the rainy season. Point 3 is the place where the flow of Topyeung stream is distracted with accumulation of dead plants giving off the odd odor as the non-point and point source pollution delivered from upper Topyeung stream is stored. Point 4 shows the area with distracted stream flow that is exposed to severe littering done by residents, fishermen and workers from outside of the communities. [Figure 3-15] below shows current view of each point, which were photographed by the author in Nov. 25, 2016.

[Figure 3-15] Current view of the points regarding mapping item No. 9 photographed in 2016. 11. 15

As for mapping item No. 10 and 12, point 6 indicated in [Figure 3-14], all 10 participants pointed upper Topyeung stream as the place is occupied with colonies of Willow tree as shown in [Figure 3-16].



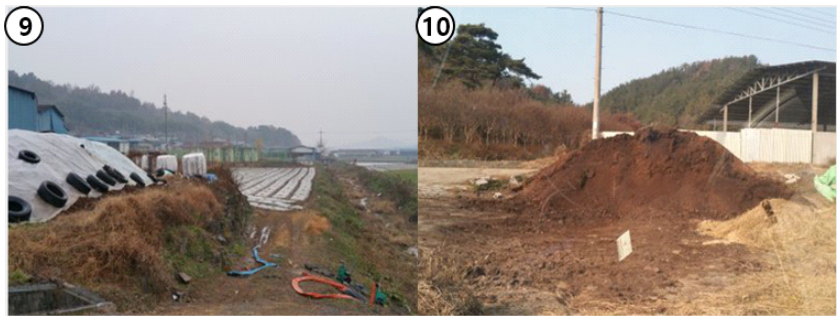
The participants were worried about considerable changes of stream environment, which completely differs from what it used to be, as participants believed that over growth of the vegetation slow down the water circulation. At the same time,accumulation of dead plants gave off the odd odor as the non-point and point source pollution delivered from upper Topyeung stream are kept.

Since fishing is allowed outside of wetland protection area, the edge of the protection area fishermen frequently come and go.Sometimes fisherman stay overnight by the stream which indicate that frequent monitoring is required for improvement of the livelihood and environment. Only 6 out of 19 participants responded to the mapping item No. 11. Despite of small number of participants and numerous areas being mapped per person, the mapping result was highly precise as indicated by point 7 and 8 in [Figure 3-14]. It was possible to grasp the areas suffering from non-environmentally friendly activities of unregistered fishermen. 5 out of 6 participants were found to be the residents of Hyojung village which is located in between two indicating points. [Figure 3-17] shows current view of the area of interest.

[Figure 3-17] View of the areas suffering from fishermen(Mapping item No. 11)

Point 7 is defined as 'Songjang-golji' by the public, which is a constructed reservoir used as a source of water for farming. Point 8 is the popular area where numerous fishermen come for camping all year round except winter.

Only 5 out of 19 participants perceived the place where piles of manure are located for farming(No.14). It was found that in Hyojung village the manures were being piled up next to Topyeung stream, in Soya village the manures were piled up right next to the canal for drainage, which could potentially become one of the severe point source pollution as shown in [Figure 3-18]. Although, one of the participants said, the location for piling manures differ by the person who takes responsibility. Therefore, there is a great chance of manure being exposed to the stream unless there is a storage built for keeping manures.



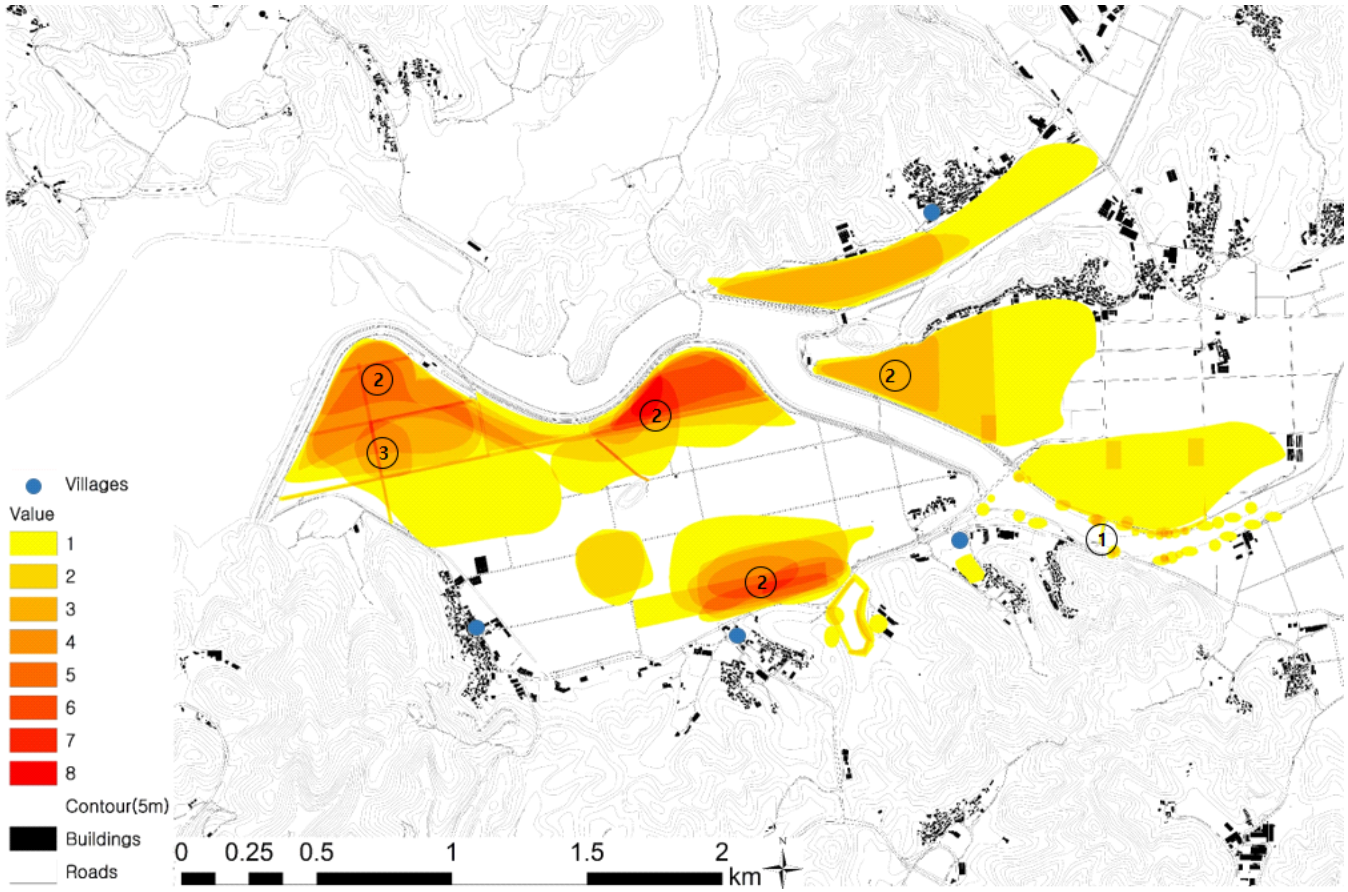
[Figure 3-18] Piles of manure prepared to be spread over garlic fields

3.2.2.3. Potential Area

Potential area plays an important role for sustainable ecotourism as it could potentially contribute to conservation and become tourist attraction with supports of belonging communities. Potential areas in this research site tend to be in less control due to two reasons. Firstly, since the area does not provide much of benefits to the communities due to disqualifying condition for cultivating current cash crops. Secondly, since the area is not included in the protection area, less restriction is applied nor monitoring. Hence, the area is exposed to varieties of non-environmentally friendly activities. For potential area, the mapping items are selected as shown in [Table 3-15] below. Areas are delineated as shown in following [Figure 3-18] and then followed by explanations of selected mapping items.

[Table 3-15] Selected mapping items for Potential areas

No.	Selected Mapping Items
11	Where fishermen frequently camp and litter
16	Plots with low yield due to poor water infiltration.
17	Plots that require excessive amount of herbicides or pesticides
18	Plots that are left fallowed
19	Plots where crops other than garlic or onion are cultivated



[Figure 3-19] Map of Potential Area

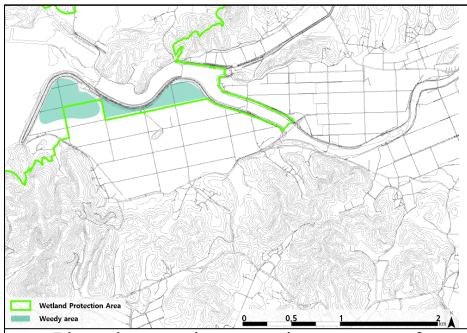
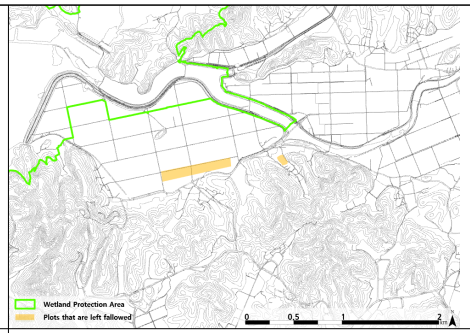
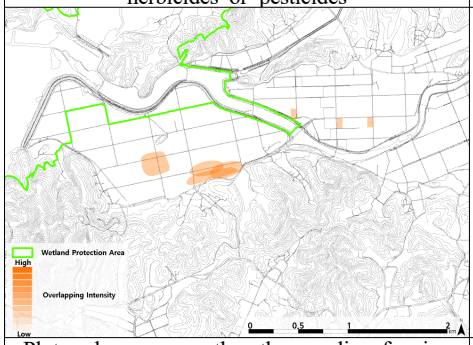
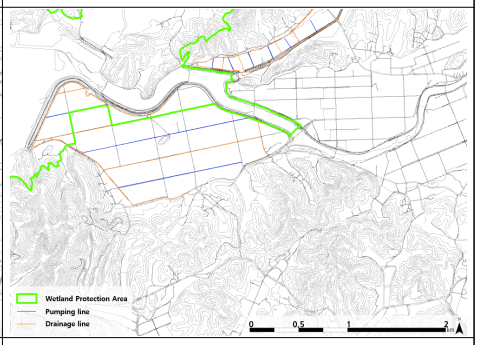
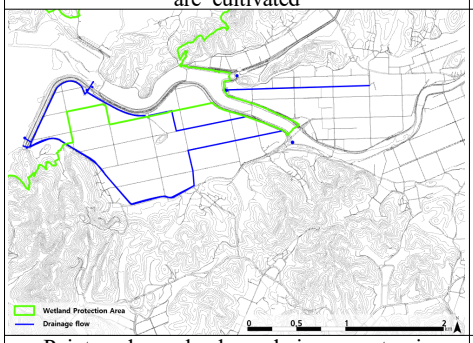
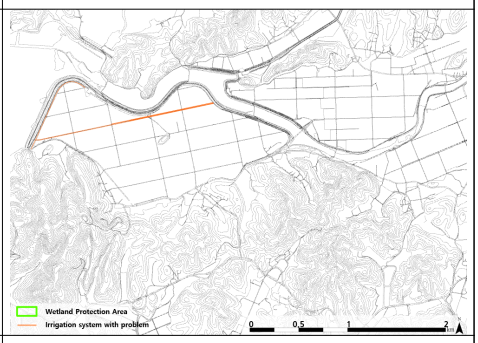
No. 11 indicated as point 1 in [Figure 3-19] is currently being perceived as an attractive area by the certain people who is interested in fishing. Although with better management of the area, it could potentially become tourists attraction by providing opportunities to experience the stream environment.

Mapping item No. 16, 17, 18, 19 and 23 have varieties of potential for supporting wetland conservation activities while providing tourists attractions with active involvement of the residents. No. 16, 17, 18, 19 indicated as point 2 in [Figure 3-19] are dysfunctional farmlands, which has potential to be transformed into the field for testing more environmentally friendly alternative cash crops. The field could also be transformed into constructed wetland for water purification and providing habitats for migratory animals, which could potentially become tourist attraction. No. 23 indicated as point 3 in [Figure 3-19] potentially provide visitors opportunities to experience the agriculture of the region and connects the mapping item No. 16, 17, 18 and 19.

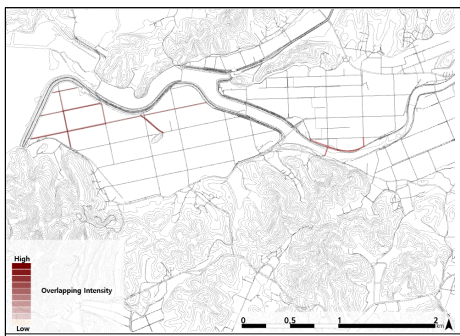
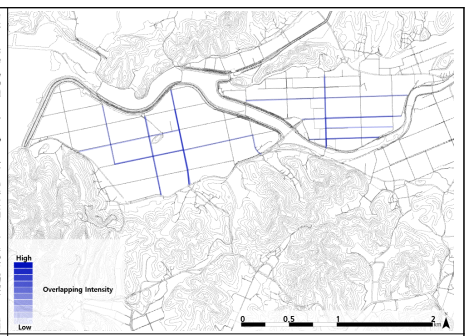
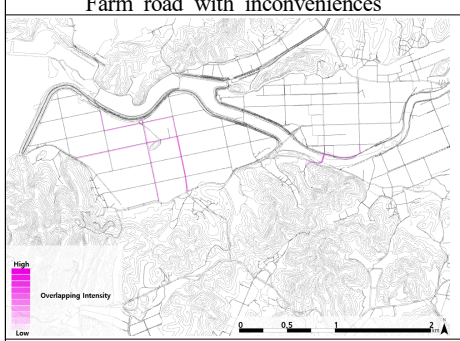
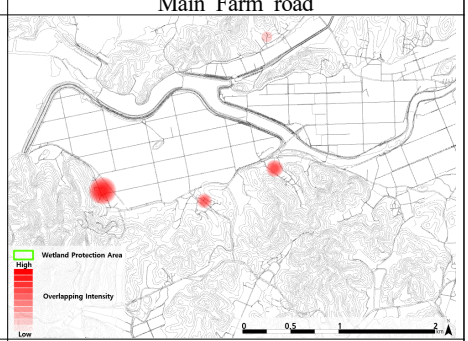
Additional maps created

In [Table 3-16] and [Table 3-17], rest of the results are included and the results derived from the cognitive mapping.

[Table 3-16] Rest of Cognitive mapping created based on perception of the participants toward living and working environment

	
Plots that require excessive amount of herbicides or pesticides	Plots that are left fallowed
	
Plots where crops other than garlic of onion are cultivated	Flow direction of irrigation system and drainage
	
Point and canal where drainage water is released from the farmland	Irrigation system with problem

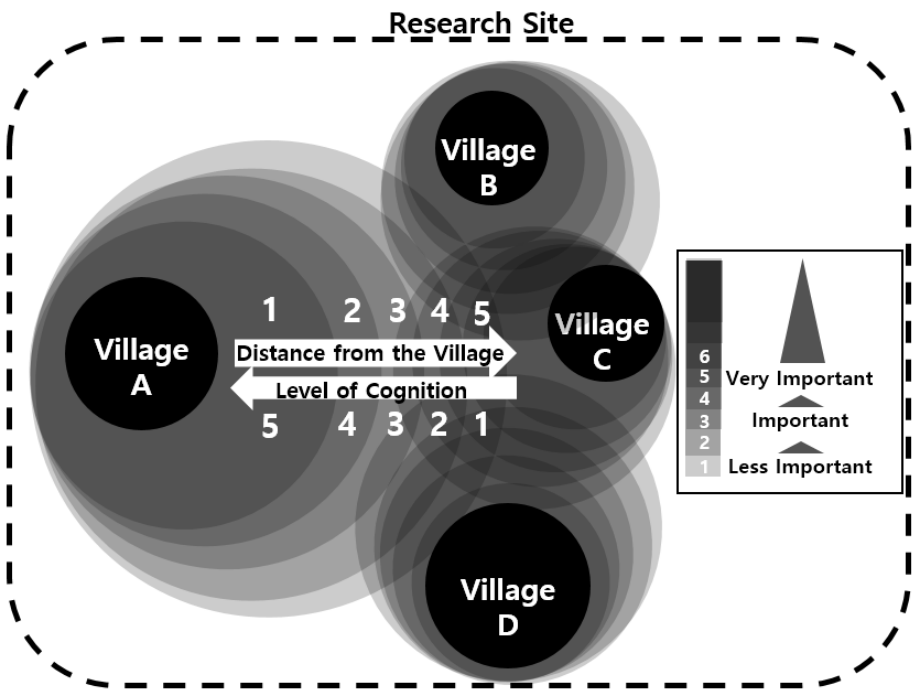
[Table 3-17] Rest of the Cognitive mapping created based on perception of the participants toward living and working environment II

	
Farm road with inconveniences	Main Farm road
	
Farm road where visitors tend to distract farmers	Recommendable place among 4 villages for establishment of visitor center

3.2.3. Standard settings of cognitive map for overlapping analysis

As for three different cognitive maps, there are great numbers of polygons being overlapped with maximum frequencies ranging from 8 to 19, which needs to be simplified for further analysis. The study suggests the standard setting of the class for cognitive map, based on the frequencies of overlapping. The cognitive mapping was conducted with 4-5 participants from each of 4 villages and the number of overlapping layers need to be set to decide its effectiveness. To determine effective number of overlapping layers, the number of participants per village and correlation of their range of cognition, based on the distance were considered, referring to the

term 'Sense of place'[13] suggested by D. Williams(1998) as shown in [Figure 3-20].



[Figure 3-20] Concept of changes in cognition regarding distance

Since the research site is located in rural area the acceptable numbers of overlapping polygon is determined to be equal or more than 3. Generally a person does not have difficulties to cognize the surrounding areas, but it gets more difficult to cognize the area that is not a part of their daily life. Therefore, considering any area that is cognized by more than 50% of the participants from same village, 3 overlapping polygons are to be acceptable in this case of study. Additionally, the number of overlapping area with more than total number of participants from same

13) Sense of place is referred as 'The emotional bonds that people form with places(at various geographic scales) over time and with familiarity with those place' said by D. Williams(1998).

village. Scale of 5 is to be areas of importance in this case, since the area is perceived by other villagers regardless of the distance. As a result, the frequency of overlapping less than 3 is excepted for analysis. Overall, areas being overlapped more than 3 times is considered for further analysis.

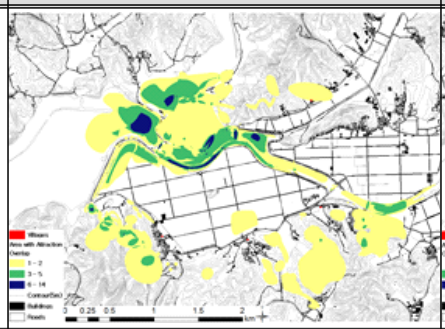
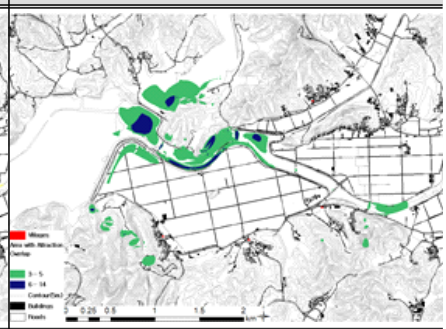
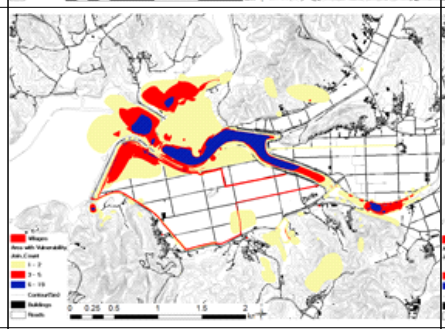
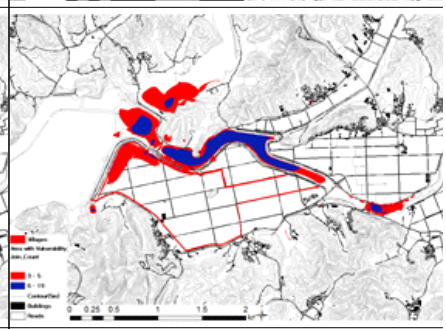
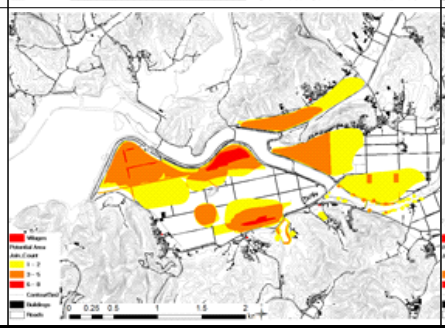
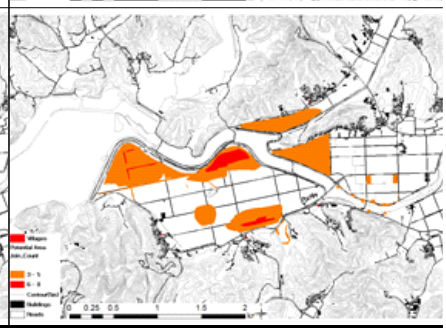
Based on the settings, all three cognitive maps showed considerable gaps in the sizes as shown in [Table 3-18].

[Table 3-18] Changes in size of cognitive maps after application of the setting

Cognitive Map	Area before setting(km^2)	Area after setting(km^2)
Area with Attraction	2.85	0.65
Area with Vulnerability	2.36	0.84
Potential Area	1.89	0.61

After application of the setting, area with attraction was decreased by 77.2%, an area with vulnerability was decreased by 64.6% and potential area was decreased by 67.8%. The changes in size are visualized as shown in [Table 3-19] below .

[Table 3-19] Changes in sizes of cognitive maps after application of the setting

Map	Before Setting	After Setting
Area with Attraction		
Area with Vulnerability		
Potential Area		

As for areas with attractions, great amount of the forest area was excluded, as it is expected to be related to the sense of place, since the accessibilities to different forest differs due to the location of the villages and similar changes can be seen as area with vulnerability. Regarding potential area, farmland was partially excluded.

3.3. Overlapping Analysis

3.3.1. Overlapping state of existing land use zonings

There are total of 6 land use zoning along with wetland protection zone. Within the site and every zones have its own purpose, allowance and restrictions. Although, there are various overlapping zones, proved to be resulting in dispersion of the management. There are already countless complaints about land use regulations related to either livelihood of the residents or conservation of the natural environment in the community of Upo wetland. In this study, areas with different combinations of land use zonings, its size and tendency are to be verified.

Each layers of 7 zonings[14] are overlapped using Arc GIS 10.2 to verify existing combinations of different zonings. As a result, there are 31 combinations of zonings derived from 7 zones. Total area of the research site is estimated to be 15425358.4 m²and areas less than 5 m²are excluded from the analysis due to two reasons. Firstly, such small area will have extremely small effect on spatial planning. Secondly, there could be a subtle difference in geographical information, since the data are prepared by two different institutes[15]. The tendencies of combination of zoning are classified into 'Conservation', 'Conservation-Production', 'Production', 'Production-Development' and 'Development' for further analysis and the tendency of Wetland Protection Area (WPA) is considered as advanced conservation since previous researches and residents have been valuing the conservation of Upo wetland. In other words, the tendency of any combinations that consist of WPT is considered as 'Conservation'

14) Existing Zonings : Wetland Protection Area(WPA); Rural Settlement Zone(RSZ); Planned Management Zone(PLMZ); Conservation Management Zone(CMZ); Production Management Zone(PMZ); Agriculture Promoted Zone(APZ); Agricultural Activity Zone(AAZ).

15) Wetland protection area is designated by Ministiry of Environment and the rest of the zones are designated by Ministry of Land, Infrastructure and Transportation

and the list of other combination of zonings. [Table 3-20] shows the list of existing combination of zonings, its area and the tendency based on its purpose is explained in section 2.1 of the study. The tendencies of each zones are to be used when comparing cognitive map to existing zonings to verify the suitability of cognitive map.

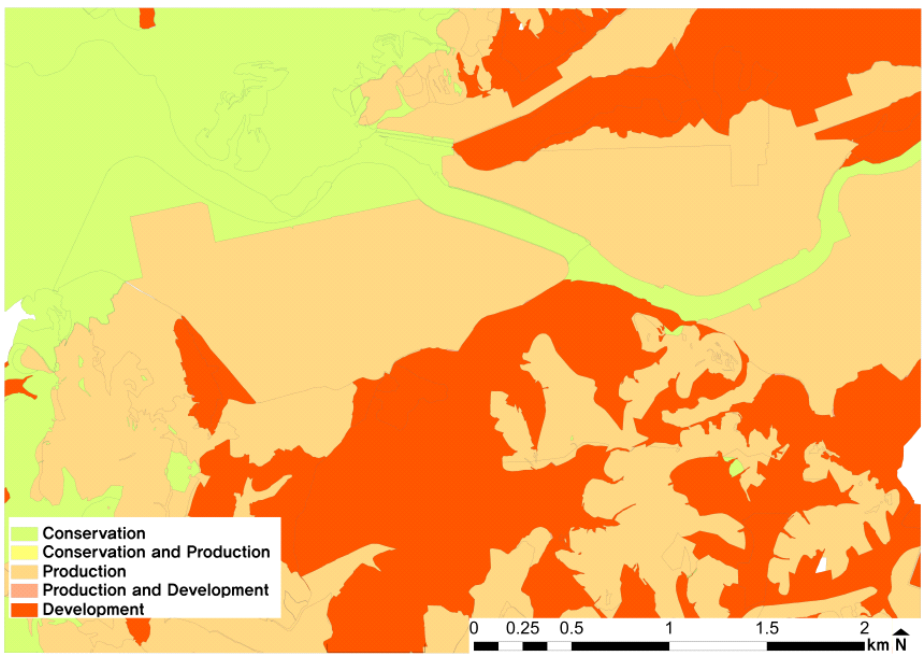
[Table 3-20] Tendency, area for different combinations of zoning

Tendancy	Zone	Area (m^2)	Conservation	Production	Development
Conservation	WPA_CMZ	2097525.4	●●●●		
	CMZ	685585.9	●		
	WPA_APZ_AAZ	395659.1	●●●	●●	
	WPA_AAZ	217071.5	●●●	●	
	WPA_PLMZ	18510.0	●●●		●
	WPA_CMZ_APZ	1643.7	●●●●	●	
	WPA_PMZ	199.7	●●●	●	
	WPA	22.0	●●●		
	Total	**2730631**			
	Percentage	**17.7 %**			
Conservation and Production	CMZ_AAZ	292.6	●	●	
	CMZ_APZ	42.0	●	●	
	Total	**334.6**			
	Percentage	**0.01%**			
Production	APZ_AAZ	3820071.1		●●	
	AAZ	2250817.3		●	
	PMZ	1336075.3		●	
	APZ	1546.4		●	
	PMZ_APZ	850.1		●●	
	APZ_AAZ_PLMZ	27.8		●●	●
	Total	**7409388.3**			
	Percentage	**48%**			
Production and Development	PMZ_RSZ	13630.7		●	●
	APZ_PLMZ	2046.9		●	●
	AAZ_RSZ	807.7		●	●
	PMZ_AAZ	165.3		●	●
	AAZ_PLMZ	90.7		●	●
	APZ_RSZ	21.1		●	●
	Total	**16762.4**			
	Percentage	**0.01%**			
Development	PLMZ	4183418.8			●
	RSZ_PLMZ	398792.8			●●
	RSZ	13630.7			●
	APZ_RSZ_PLMZ	247.1		●	●●
	Total	**4596089**			
	Percentage	**29.8%**			
Excluded	PMZ_APZ_AAZ	1.5		●●	●
	CMZ_PMZ	1.5	●	●	
	WPA_CMZ_AAZ	0.7	●●●●	●	
	AAZ_RSZ_PLMZ	0.2		●	●●
	WPA_AAZ_PLMZ	0.1	●●	●	●
Total		**15425358.5**			

●●●● for combination of Wetland Protection Area and Conservation Management Zone, ●●● for Wetland Protection Area(WPA) and ● for Rural Settlement Zone(RSZ); Planned Management Zone(PLMZ); Conservation Management Zone(CMZ); Production Management Zone(PMZ); Agriculture Promoted Zone(APZ); Agricultural Activity Zone(AAZ).

Resource : Ministry of Environment (www.egis.me.kr), Ministry of Land, Infrastructure and Trasportation (www.nsdi.go.kr)

[Figure 3-21] shows the distribution of various combinations of pre-existing zonings that are classified into groups based on its tendencies. The land use zonings with tendencies of 'Conservation', 'Production' and 'Development' took over the majority of the research site.



[Figure 3-21] Distribution of the tendencies of land use zonings and WPA

Overall, the combinations of zonings are classified into 5 different tendencies and tendencies of 'Conservation', 'Production' and 'Development' were verified as main tendencies of all the zonings in research site; is used for analyzing the suitability of the cognitive map for planning process.

3.3.2. Proportion of cognitive map with comparison to land use zoning

Having a great subjectivity since the data was collected from individuals, which may have been influenced by individual's emotion, sense of values and depth of knowledge is the risk of cognitive mapping method. Therefore prior to using cognitive map for ecotourism planning, suitability of the mapping items are analyzed. Three different cognitive maps derived from section 3.2 of the study are overlapped with the pre-existing land use zonings that are grouped into three main tendencies. By verifying parts of 'Area with attraction', 'Area with vulnerability' and 'Potential area' with different tendencies of land use zoning, it brings the cognitive map to another practical level.

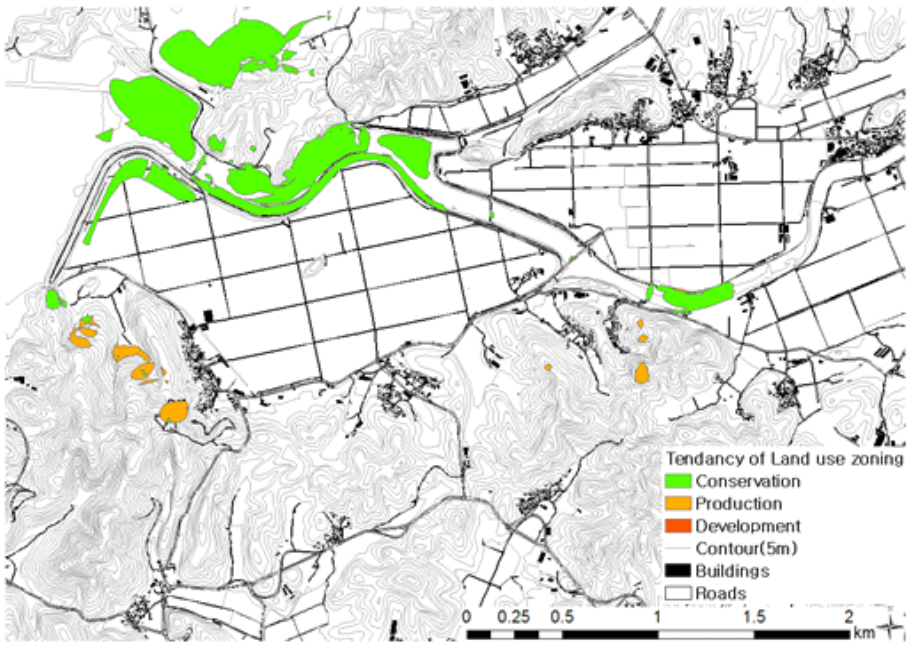
As a result, total of 652509.7m² of 'Area with attraction' derived from cognitive mapping, 599901m², 52481.8m², 126.0m² overlapped with land use zones with tendency of 'Conservation', ‘Production' and 'Development', respectively. Total of 838339.1m² of 'Area with vulnerability' 771420.8m², 64596.9m², 2321.4 m² overlapped with land use zones with tendency of 'Conservation', 'Production' and 'Development', respectively. Total 606802.0m² of 'Potential area' 247519.4m², 346776.5 m², 12506.1 m² overlapped with land use zones with tendency of 'Conservation', 'Production' and 'Development', respectively. The proportion and the area are summarized in following [Table 3-21].

[Table 3-21] Proportions and areas of different land use zoning tendencies overlapping with each type of cognitive map

Cognitive Map	Tendency of Land use zoning	Area(m^2)	Proportion
Area with Attraction	Conservation	599901.9	91.9
	Production	52481.8	8.0
	Development	126.0	0.01
Area with Vulnerability	Conservation	771420.8	92.0
	Production	64596.9	7.7
	Development	2321.4	0.3
Potential Area	Conservation	247519.4	40.79079
	Production	346776.5	57.1482
	Development	12506.2	2.061001

Considering such complex combinations of land use zoning, the purpose and regulations for each zonings covered in paragraph 3.3.1 and section 2.1. Comprehensive and flexible consideration is required for all three cognitive maps.

In paragraph 3.2.2 of the study, the role of 'Area with attraction' is determined to be, interpretation while benefiting the community with varieties of tourist attraction with community involvement. [Figure 3-21] shows the distribution of different land use zoning tendencies within 'Area with attraction'.

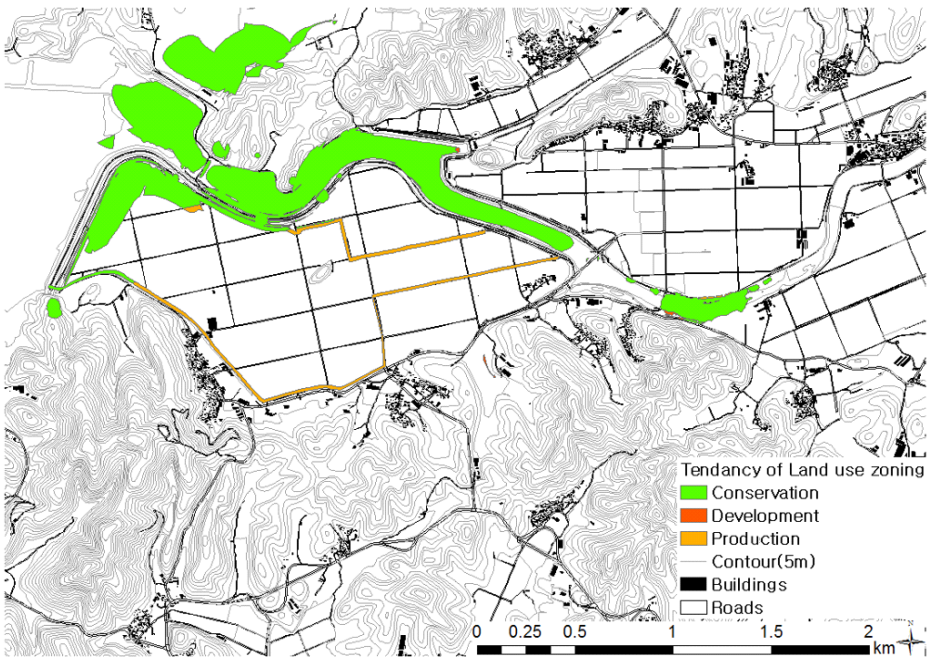


[Figure 3-22] Map of 'Area with attraction' overlapping with different tendencies of land use zonings.

According to [Figure 3-22], it is clear that majority of 'Area with attraction' overlaps with land use zonings with tendency of 'Conservation' then 'Production'. To contribute to interpretation while benefiting the communities with varieties of tourist with community involvement, areas overlapping with land use zonings with tendency of conservation should provide experience to sense the wilderness, while securing the quality of the wetland environment. As for areas overlapping with tendency of 'Production', the area shall be used by residents for producing goods while being used for exploring natural and cultural experiences under the permission of land owners. Additionally, the areas should be interconnected with pre-existing trails which shall provide active, environmentally friendly experiences, while engaging both visitor and the communities together.

The role of 'Areas with vulnerability' is determined as providing a careful

management for areas that are likely to be exposed to or already influenced by environmentally threatening factors. [Figure 3-23] shows the distribution of different land use zoning tendencies within 'Area with vulnerability'.

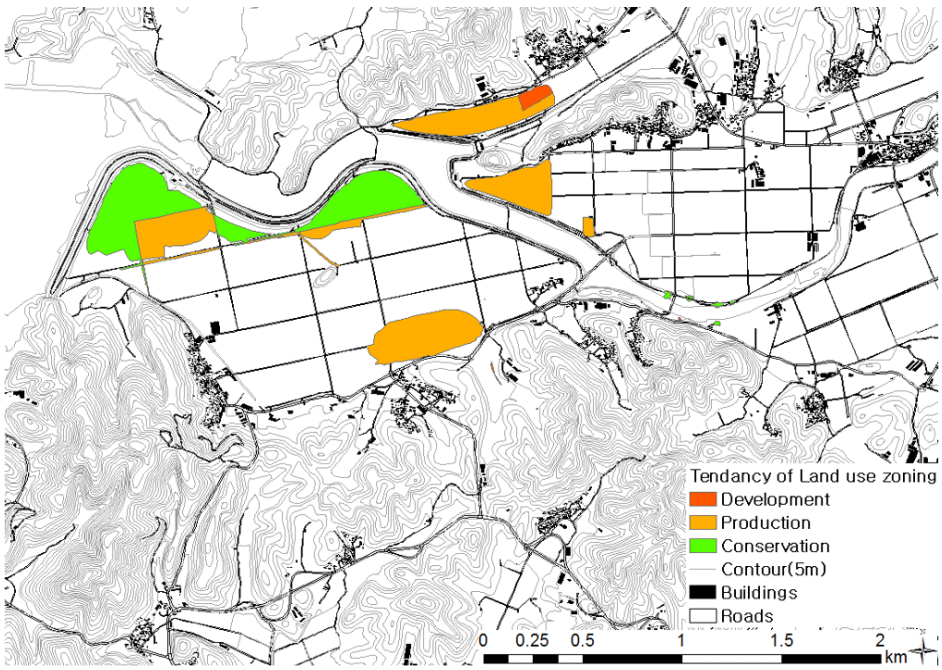


[Figure 3-23] Map of 'Area with vulnerability' overlapping with different tendencies of land use zonings.

The majority of 'Areas with vulnerability' overlaps with land use zonings with tendency of 'Conservation' which is similar to 'Area with attraction' but more distributed. Great distribution of land use zoning with tendency of conservation within 'Area with vulnerability' map indicates two different facts. Firstly, the residents perceive that the area with great natural value may be influenced by threatening factors. Secondly, despite of the fact that the areas are designated as 'Wetland conservation area', 'Conservation management zone' or both, the areas have not been managed properly. Few lanes of farm roads and irrigation system within

land use zoning with tendency of production are shown in [Figure 3-22]. This could be interpreted as resident perceived farm road and irrigation system negatively impact the wetland environment, which needs investigation prior to constant monitoring and management with involvement of residents. The right end of Topyeung stream overlaps with land use zoning with tendencies of 'Conservation' and 'Development'. The area is designated as 'conservation management zone', it is located next to the boundary of WPA, which proves that improved management is required for littering and fishing activities outside of WPA as well.

The role of 'Potential area' is determined as mutually supporting local economy and conservation of the environment flexibly, depending on status of surrounding environment. Therefore, land use zoning tendency is a necessary factor to be considered to engage land use behavior with surrounding environment, for suitable management with involvement of communities. Majority of 'Potential area' overlap with land use zoning with tendency of 'Production', preliminarily verified as dysfunctional farmland.Distribution of different tendencies regarding combinations of land use zoning is shown in [Figure 3-24]



[Figure 3-24] Map of 'Potential area' overlapping with different tendencies of land use zonings.

Area with tendency of 'Conservation' has been delineated in 'Area with vulnerability' and 'Area with attraction' as well. Areas mentioned above could be referred as the area is in need of sensitive management while providing natural experience. Such area could be transformed into constructed wetland to cope with non-point and point source pollutions, being released from the communities and farmlands around. As for land use zonings, with tendency of 'Production', 'Potential area' the cognitive map majorly overlapped. Such production area is adjacent to other farmlands, which could contribute to experimentation of other alternative crop to cope with current non-environmentally friendly agricultural activities.

Overall, within land use zonings with tendency of 'Conservation', all three cognitive map overlapped, which could provide natural experience with sensitive

management and monitoring. As for land use zonings with tendency of 'Production' and majority of 'Potential area' overlapped, which potentially provide assets to the community economically and environmentally with active community involvement for conservation and ecotourism activities. As for land use zonings with tendency of 'Development', the facility supporting the engagement of the communities and ecotourism could be established. In next chapter, the results of overlapping analysis derived from different cognitive map and tendency of land use zonings are aggregated together for comprehensive ecotourism zoning and customized ecotourism programs.

Chapter 4: Planning

4.1. Zoning Plan

4.1.1. Concept of Zoning

Throughout the previous chapters, environmental status of upper Topyeung stream has been analyzed with residents and ecotourism oriented perspectives for planning sustainable ecotourism. This research aims to apply the perception of the residents as a fundamental factor in the process of planning, while keeping ecotourism oriented perspectives. Therefore, the concept of zoning is to be determined based on the results of various analyses prior to zoning process. Types of results derived from the analyses are summarized in [Table 4-1] and explained below.

[Table 4-1] Proportions and areas of different land use zoning tendencies within each type of cognitive map

Analysis	Purpose	Result	Type
Interview	Verification of the perception of the residents	Fundamental factors for cognitive mapping items	Contents
Literature Review	Recognition of the environmental status of Upo wetland, concept and principles of ecotourism	Criteria for classifying mapping items with ecotourism oriented perspective, current status of Upo wetland	Contents and Space
Cognitive mapping survey	Geographical visualization of the perceptions of residents toward existing issues and tasks	Area with attraction Area with vulnerability Potential area for existing issues and tasks	Space
Overlapping Analysis	Verification of current land use zoning	Reclassification of 31 different combinations of land use zonings into 'Conservation', 'Production' and 'Development'	Space
	Verification of the relation between cognitive maps and land use zonings	Different land use tendencies within each cognitive map	Space

Throughout the interview it was clear that areas around WPA have not been considered as ecotourism destination and there were increasing number of complaints toward conservation activities and current land use zonings. To be more specific, majority of residents complained about the restrictions for certain agricultural activities for living, degradation of the wetland, current ecotourism not benefiting local communities and being excluded from ecotourism activities. Throughout the cognitive mapping survey, attractive area going through degradation, dysfunctional area for making profit, area with attraction, area with vulnerability and potential area for ecotourism were identified. In many respects, overlapping analysis diversification of the management of land use zoning due to overlapping consequence were recognized.

Overall, comprehensive zoning is needed through modification of three conceptual pillars of ecotourism; Conservation, Interpretation and Community, based on integration of clues derived from the interview, cognitive map to tackle such complex challenges.

In the zoning process, WPA comes as priority for conservation due to reputable ecological value of Upo wetland. Three zones are determined as 'Eco-Sensitive Zone', 'Nature Exploring Zone' and 'Mutual Support Zone'.

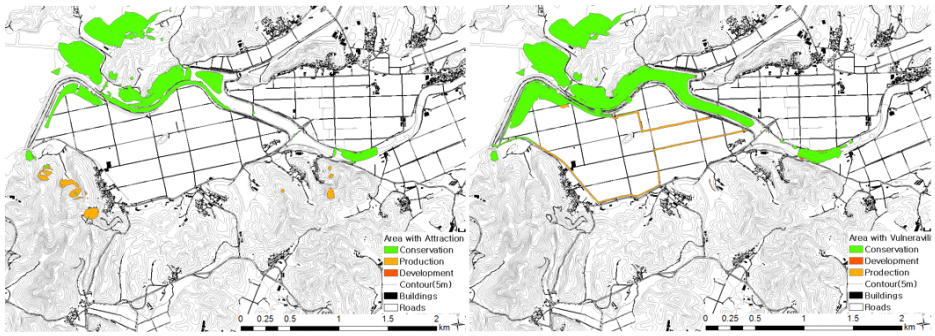
'Eco-Sensitive Zone' derived from 'Conservation', the conceptual pillar suggested by TIES. Within 'Eco-Sensitive Zone (ESZ)' securing quality of the wetland environment is the priority and should provide visitors and residents opportunities to sense the nature and to get involved in conservation activities. 'Nature Exploring Zone (NEZ)' is intended for active and environmentally friendly natural and cultural experience while engaging the communities and visitors together. The zone needs to have a great accessibility through ancient trail, which interconnect surrounding communities together to promote active community participation for securing profit and integrated

management of the zone. 'Mutual Support Zone(MSZ)' is intended for supporting both local communities and conservation of the wetland alternatively and a complete authority for managing and planning, MSZ is given to the owner of the property. MSZ should revive villagers to find the value of natural resources on their own and reconnect villagers with the wetland like the past. After designating each zones, sub-zones are to be designated for detailed application and management.

4.1.2. Zoning

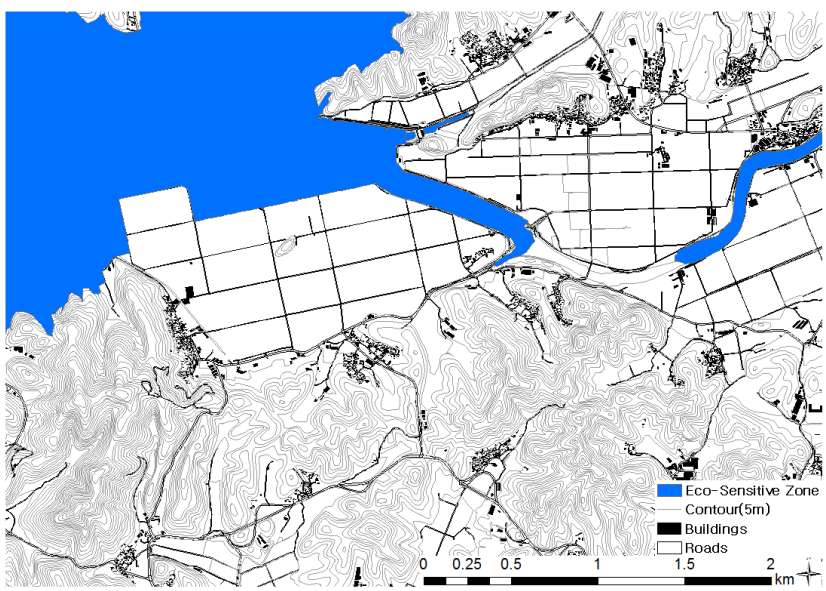
Zonings for ESZ, NEZ and MSZ are designated based on the results of cognitive mapping and overlapping analyses. Firstly, all the areas and belongings to WPA are to be designated as ESZ, since active experience other than education and research purposes are restricted under Wetland Conservation Act. 'Area with Attraction' is most likely to be designated as 'NEZ', by reason of great amount of natural and cultural resource exist within the area. 'Area with Vulnerability' is most likely to be designated as ESZ, considering vulnerable areas need intensive management and monitoring. 'Potential Area' is most likely to be designated as MSZ, by reason of MSZ is intended to support both local communities and conservation of the wetland alternatively, while making profits. Despite exempting number of overlapping layers of cognitive map below 3, in section 3.2 of the study. Preliminary form of cognitive map is additionally used as it delineates area with significant attraction, threat or potential, which were approved through field investigation and literature review.

There are cognitive maps that overlap as shown in [Figure 4-1] below. In such case, the accessibility and its potential contribution to whether conservation or nature exploration or supporting both are carefully considered prior to designation of zonings.



[Figure 4-1] Cognitive map of Area with Attraction(Left) and Area with Vulnerability(Right)

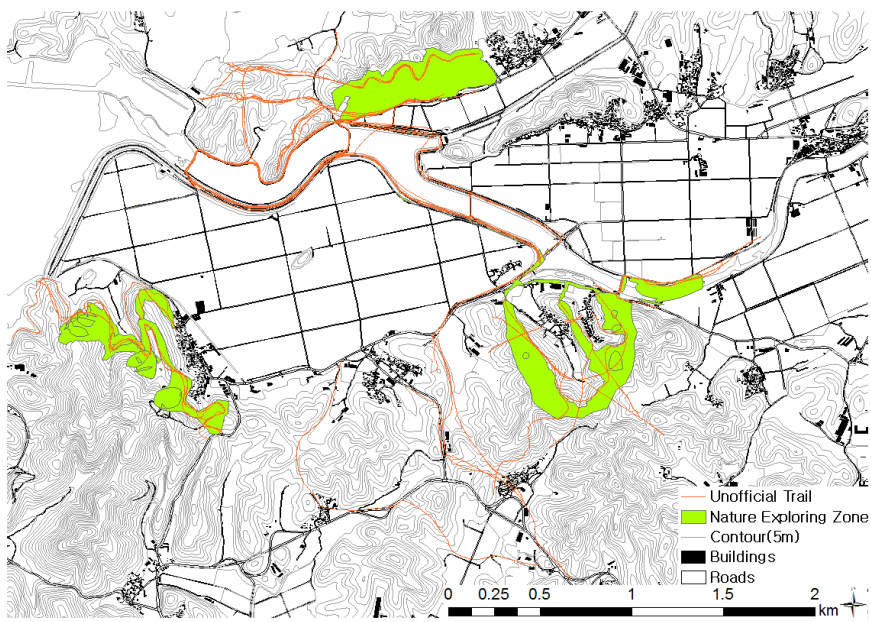
As for designating ESZ, combinations of 'AWV', 'WPA' and other areas that are approved to have great potential to be vulnerable by field investigation and literature review were used. The majority of the stream was designated, except for part of the stream that was frequently visited by the fishermen as shown in [Figure 4-2].



[Figure 4-2] Distribution of Eco-Sensitive Zone

The reasons for excluding a part of stream are, the area has a great accessibility for both visitors and residents, has already been approved by residents, author through field investigation and cognitive map(AWV). Furthermore there is an open space, that is suitable for varieties of activities more than just education and research. In addition, east end of the stream was designated as ESZ, by virtue of the farmland, factories and densely populated area[16] near east end of the research site (Kim, 2007; Seo, 2009; Kim, 2010; Jun, 2017Kim, 2011; Koo, 2009).

NEZ is intended for providing the most active cultural and natural experiences out of all three zones by engaging local community and the visitors together. Therefore, for better engagement, exploration through experiences and the services of local community, a combination of 'AWA', specific area derived from preliminary form of 'AWA' and unofficial trail are used for designation of NEZ as shown in [Figure 4-3].

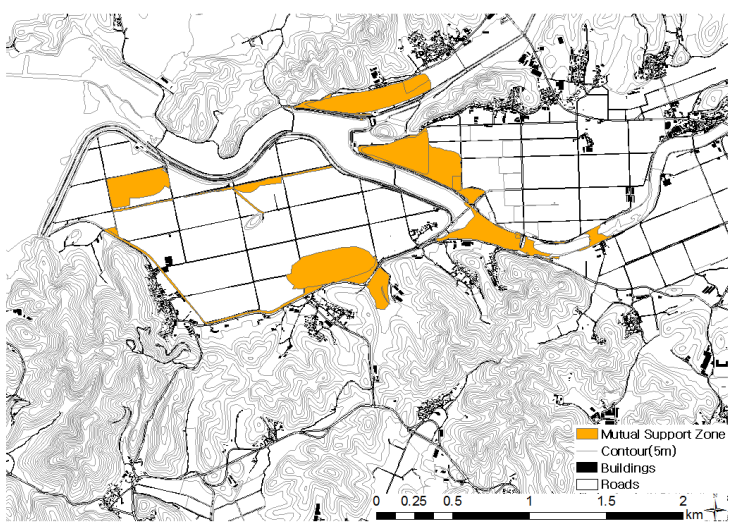


[Figure 4-3] Distribution of Nature Exploring Zone

16) Changnyeung-eup

The stream adjacent to Hyojung village is designated as NEZ to provide diverse experience on waterside, which is an open space. Streams on both side of NEZ designated stream are designated as ESZ, intended for continuous management of the Topyeung stream along with active ecotourism activities. Other areas designated as NEZ include forest and village trail for different kind of activities with a contribution to local economy. NEZ is mostly private property, therefore, every activities need an authorization of the owner in the process of planning and management.

As for designating MSZ, combination of 'Potential Area' and 'Area with Attractoin' were used. The goal of MSZ is to make local residents to recognize the value of natural environment by engaging local residents with visitors and surrounding environment to activate conservation and ecotourism activities to gain profit for living. Therefore, MSZ require great accessibility to both communities and natural environment as shown in [Figure 4-4].



[Figure 4-4] Distribution of Mutual Support Zone

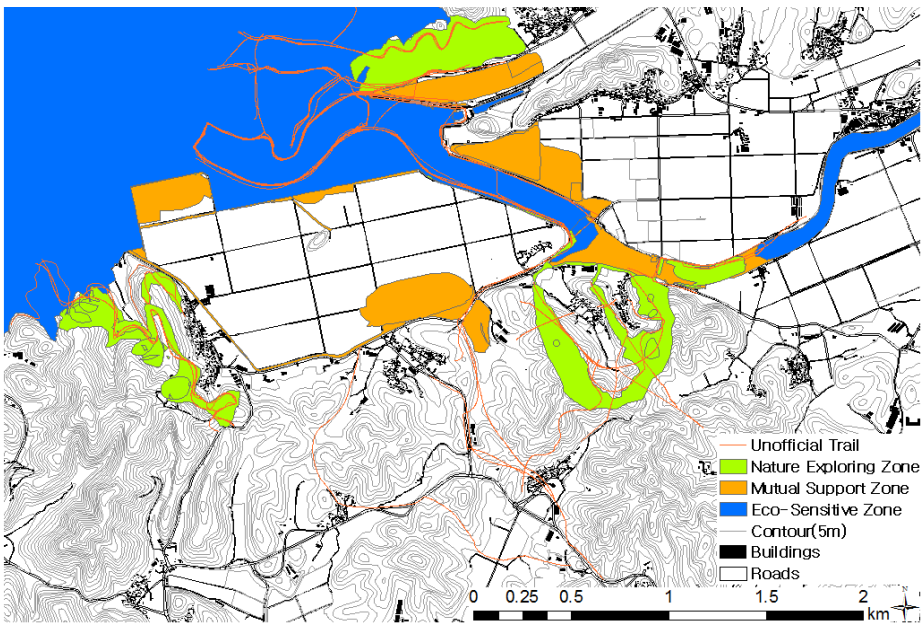
Majority of MSZ consists of farmland where residents spend time on daily basis. Such high accessibility potentially contributes to involvement of local residents for monitoring the environment and servicing the visitors at the same time.

Overall, zoning for sustainable ecotourism was conducted and it was possible to draw three different zones based combination of cognitive maps derived from section 3.2 of the study. Area and proportion of each zones are shown in [Table 4-2].

[Table 4-2] Proportions and areas of different land use zoning tendencies within each type of cognitive map

Zone	Area(m^2)	Percentage
Eco-Sensitive Zone	56243678.2	97.30
Nature Exploring Zone	866812.7	0.015
Mutual Support Zone	692647.3	0.012
Total(Zone)	57803138.3	100%
Total(Research Site)	15425358.5	100%

By looking at proportion of the zonings shown in [Figure 4-5], ESZ dominated the research site over NEZ and MSZ, it is obvious as large portion of WPA is included in a research site, proved to provide habitats for great numbers of biodiversity.



[Figure 4-5] Zoning for Sustainable Ecotourism

Small portions of MSZ and NEZ are partially distributed around ESZ which is intended to alleviate the activities threatening ESZ as verified with an application of cognitive map. All three zonings are interconnected with unofficial trails which allow human activities. Although, the comprehensiveness of each zone for human activities vary. MSZ has the highest comprehensiveness of human activities, since the zone harmonizes the livelihood of the residents, ecotourism activities for tourists and conservation or restoration of the environment by allowing residents to decide whether to contribute to conservation, restoration or ecotourism activity for making profit. NEZ has an intermediate comprehensiveness of human activities by reason of the zone being designated for natural and cultural experiences under the authorization of the landowner. ESZ has the lowest comprehensiveness of human activities considering the areas have high vulnerability. Although, great quality of natural resources existing within the zone still allow considerate exploration.

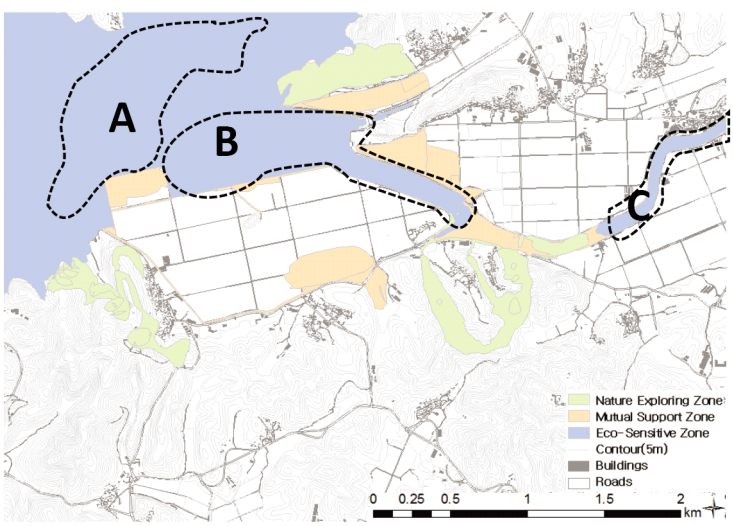
4.2. Application and Management Plan

4.2.1. Wetland Conservation and Management

4.2.1.1. Management Plan

Upo wetland has been issued for its current state of degradation caused by various human activities. The prominent threats to Upo wetland are proved to be mass production in agriculture, littering and improper waste water. In this paragraph of study different managements and programs are suggested for each zonings to alleviate existing environmental threats and to promote wise use of wetland resources based on zonings suggested in section 4.1 of the study. The surrounding environment and the tendencies of current land use zonings within ESZ, NEZ and MSZ are considered for wetland conservation and management.

ESZ dominate most of water surface within the research site which is consists of land use zoning tendency of 'Conservation' covering 99% of the zone which indicate that the management and program should be conservation based. Throughout the field investigation, literature review and cognitive mapping ESZ is sub-divided into three areas based on specific characteristics as shown in [Figure 4-6].



[Figure 4-6] Sub-division of ESZ based on its characteristics

Subdivision A is designated by reasons of the area provides habitats, varieties of migratory birds and Otter[17] and the area is exposed to pre-existing ecotrail, which have been issued for threatening migratory birds. Subdivision A also consists of farmland, where birds come to find grains during the winter. Which indicate that subdivision A is a great place for bird watching and monitoring environmental status. Therefore, Sub-division A is one of the most attractive and sensitive area. The residents of Daedae and Soya are preferable to become familiar with behavior of the bird species, so the residents could participate in monitoring and teaching visitors proper manners when walking through the trail. Furthermore, unpaved farmroad where residents complain about, could be utilized as trail for visitors to communicate with local residents and migratory birds. Farmland with low yield could be transformed into constructed wetland which would provide improved quality of habitats contributing to active biodiversity. Although, the control of invasive animals such as wild boar and water deer need to be kept away from the area. Careful management of constructed wetland is needed to secure incomes of community and wetland environment. Therefore, native cash crops with brand logo along with securing market is preferable.

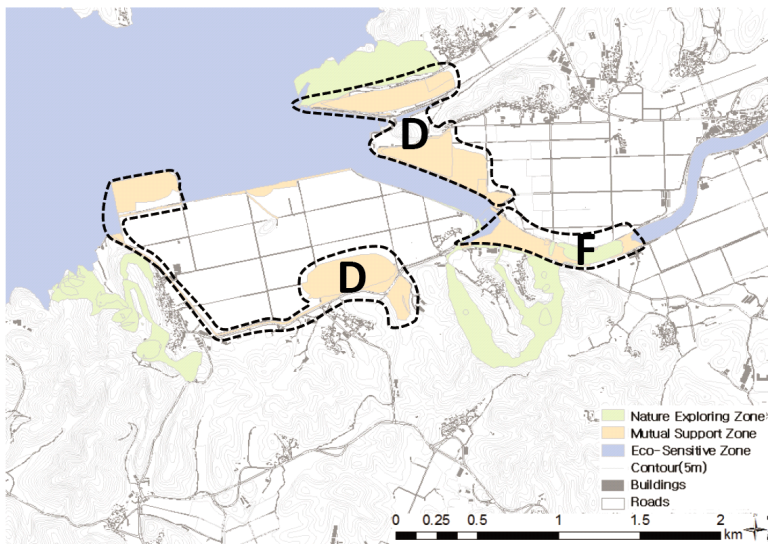
Subdivision B indicated in [Figure 4-6] is designated as the area has a great natural and cultural resources. Throughout the cognitive mapping, it was proved that people have most place attachment to the area since both 'Area with vulnerability' and 'Area with attraction' were concentrated within this specific area. Due to restrictions of entry, the area has been fully occupied with willow trees and the residue distracts the water flow of Topyeung stream, which releases odd odor during the summer. Therefore, the area is cleaned by civil servants twice a year. On the

17) Endangered Species Class I approved by Ministry of Environment

other hand, the area is the place where residents from different villages gather together for leisures and washing clothes before degradation of the stream. It is possible that residents could contribute to management of the area considering the residents have valued the area the most. The residents could be given with privilege to enter the stream for better management and monitoring. By allowing residents to enter the stream, the residents will for natural experience for visitors could be gained within the area along through story telling, observation, monitoring with the residents and volunteer for maintenance of the area with the residents only.

Subdivision C indicated in [Figure 4-6] is exposed to severe sources of pollution such as areas with dense population, agricultural activity, factories and slaughter houses located along upper Topyeung stream out side of the research site. Subdivision C require strict management for securing water quality. To promote active management with resident participation it is important to allow residents to use the stream as a resource for making profit through activating ecotourism. Although, prior to activating ecotourism at the area in between subdivision B and C the quality of water need to be improved with supports of the government.

MSZ includes two sub-divisions that are related to small portion of Topyeung stream and irrigation canal that is connected to the wetland as shown in [Figure 4-7]. Both areas have been issued and complained by the residents due to unpleasant odor and litter caused by visitors and residents. Two sub-divisions are exposed to the residents on daily basis, therefore, residents are capable to detect small changes of the area, which is a great source of monitoring method. Sub-division D consists of farmlands that gives low yield of garlic and onion, the major cash crop of the community. As explained previously, MSZ is intended to contribute to both



[Figure 4-7] Two subdivisions within MSZ

conservation and ecotourism, or either for residents to gain profit. The waste water from the households of Kwandong village flows through the canal within subdivision D and released into the wetland directly. Therefore sub-division D shall provide great opportunity to purify waters entering Upo wetland, since the fields within sub-division D are inappropriate for current cash crop cultivation due too poor infiltration. The field could be used for cultivating varieties of emerged plants such as Sweet-flag, known to purify water and also used as traditional cash crop. Such different ways could contribute to improve wetland environment by purifying water, while providing habitats for varieties of species. Furthermore, the field could be used to testify the value of other alternative crops to the residents who only believe in mass production of garlic and onion.

Subdivision F is different from other subdivisions as the subdivision F is part of both MSZ and NEZ. The area is adjacent to the boundary of WPA which has a great ecological value with less conservation related restrictions. Therefore, there has been great number of residents complaining about contamination and the behavior of visitors within the area. Subdivision F is known to be a reputable area among

fishermen and the area is exposed to overnight fishing, which releases large amount of wastes. Furthermore, even local residents have been throwing garbages and arson belonging trashes within the area. On the other hand, the area has a great ecological value, accessibility and open space for leisure purposes, therefore, NEZ is a part of it, since NEZ provides countless active natural experience such as fishing and canoeing.

4.2.1.2. Application of the Programs

Based on findings various seasonal programs for ESZ are suggested as shown in [Table 4-2] below.

[Table 4-3] Ecotourism Programs for Wetland Conservation within ESZ

Season	Name of the Program	Source of Profit	Subdivision
Spring	Keep the stream flow	Guide fee and Maintenance fee	B, C
Summer	Protect Fairy pitta's nests	Handmade keep quiet sign	B
	Photo shoot contest in wilderness	Entry fee	A, B
Fall	Water chestnut picking festival	Entry fee and charges for amount of water caltrop	A
	Meet the gatekeeper of Upo wetland	Maintenance fee and educative tour	C
Winter	Bird watching festival	Entry fee	A, B
	Eagle feeding event	Fees for feeds	A

In the spring the stream gets clogged by excessive amount of residues from willow tree communities. The residents are paid to keep the stream flow in great condition by picking out the residues and monitor the quality of the water. The visitors may enter the stream to feel the wilderness only with the condition of being accompanied by the resident. During the summer two programs of 'Protect Fairy pitta's nests' and 'Photo shoot contest in wilderness' could be conducted to minimize the impact caused by visitors. Both programs are static and local products such as handmade keep quiet

sign are to be sold as an item for visitors to contribute to the conservation activities. 'Photo shoot contest in wilderness' is an event that utilizes the levee for outdoor exhibition which allow large crowd to be in commune with nature while minimizing negative impacts on a nature. During the fall 'Water chestnut picking festival' can be held in constructed wetland which allow visitors to pick bucketful of Water chestnut with entry fee for profit and maintenance. In the same season the program called 'Meet the gatekeeper of Upo wetland' can be applied for providing children lessons taught by local residents to understand various ways to monitor and manage amount of water that is released from the rice paddy into the stream during the spring which contain excessive amount of nitrogen and phosphorus. During the winter bird watching festival and eagle feeding event can be held with an involvement of experts such as 'Cooperation with East Asian Australasian Flyway'.

As for sub-division D and F of MSZ various programs related to conservation and wise use of wetland are suggested as follows.

[Table 4-4] Ecotourism Programs for Wetland Conservation within MSZ

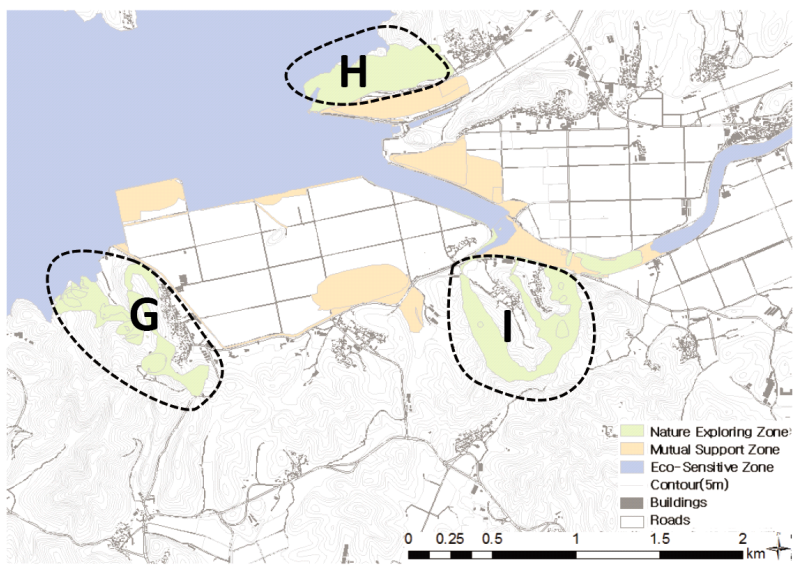
Season	Name of the Program	Source of Profit	Location
Spring	Plant your Own Water flag	Fees for tags, materials for planting and management	D
Summer	Harvest your Own Water flag	Selling secondary products of water flag and classes for secondary production	D
	Canoeing along Topyeung stream	Rental fee for equipments	F
	Fishing contest	Fees for Food, guide and services	F
Winter	Speed race along Daedae levee	Rental fee for the skate and entry fee	D

Sub-division D is a suitable place for testifying alternative crops including native water purifying plant species. Since great amount of waste water entering into Upo wetland through sub-division D has been approved sub-division D need to be used wisely for both purifying water and securing incomes of the community. [Table 4-4] above suggests an appropriate seasonal programs for wise use of sub-division D. Water flag is well known to be one of water purifying plant species. Therefore, in spring the residents can sell shoots of water flag to visitors with provision of sub-division D to plant the shoots. Such planting activity increases environmental awareness of residents and the activity can be guided by local residents and profit can be secured through fees for planting materials, name tags and management of the field. In summer, the shoots of Water flag year ago could be used to make secondary product and could be sold to the visitors and to the planters from year ago with discount. During the winter speed skating can be taken in place along the irrigation lane within sub-division D which brings back the childhood memories of the residents and visitors. Such activity is intended to improve environmental awareness of residents and visitors towards irrigation lane and surrounding environment. The profit is secured through rental fee for the skate and entry fee.

Sub-division F allows active experience in nature since the open space within the sub-division have suggested by numerous residents for its potential throughout cognitive mapping. Leisure sports such as canoeing and fishing contest can be held within the designated area and managed by the local residents. Canoeing and fishing along designated areas of Topyeung stream will provide great experience and raise awareness of both residents and visitors toward Topyeung stream if managed properly. The residents could gain profits for providing services within area such as equipment rental business, food and guide for fishing and canoeing.

4.2.2. Engagement of Local Communities for Sustainable Ecotourism

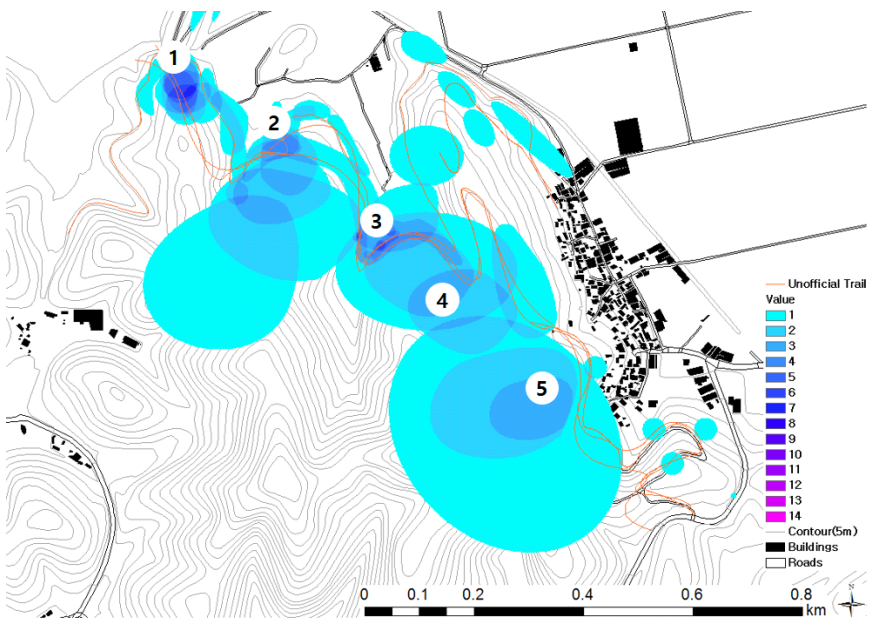
Throughout paragraph 4.2.1 of the study the importances of community participation for wetland conservation were discussed. In this paragraph of the study the involvement of local communities for active ecotourism are to be discussed with focuses on management of NEZ and active cultural and natural ecotourism programs to engage community and the tourists within each zone. There are 3 Sub-divisions within NEZ as shown in [Figure 4-7] below.



[Figure 4-8] Subdivision G, H and I within NEZ

Each sub-divisions have a great accessibility to the villages and in sub-division G and I Daedae village and Hyojung village are located inside separately. The intention of NEZ is to provide active cultural and natural experience to visitors while engaging residents. The majority of NEZ consists of land use zonings with tendency of 'Development' and 'Production' mostly unlike other two zones as shown in [Figure 4-8]. Such land use tendency allow more activities although, the authorization of the

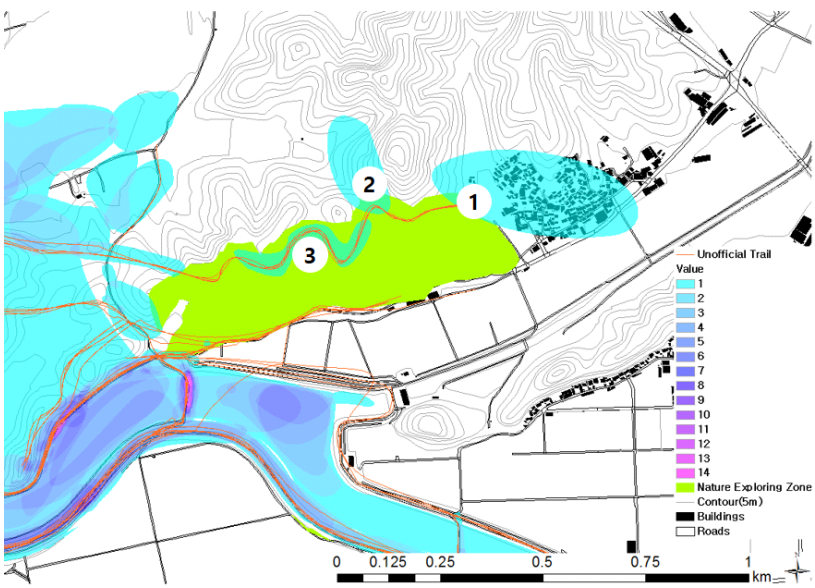
landowner need to be made in the first place. All three Subdivision in [Figure 4-7] are forest based and are proved to have a great numbers of element as an ecotourism attraction. Such attractive resources cognized by residents on their own can engage visitors and villagers a lot quicker. Its more like local residents hosting visitors in their community by introducing various attractions which took great amount of time to verify on their own. Since all the zones are exposed to residents on daily basis great quality of cultural and natural experience can be delivered to the visitors throughout the story, knowledge and culture of the local community. Throughout cognitive mapping the location of edible wild fruits are indicated as point 4, medicinal plants are indicated as point 5, unofficial trails, great view point of Upo wetland is indicated as point 1 and ritual culture indicated as point 3 within sub-division G as shown in [Figure 4-9].



[Figure 4-9] Area with attraction perceived by residents in sub-division G

Such attractions are interconnected by unofficial trails and the visitor can travel the area with support of local resident as a guide.

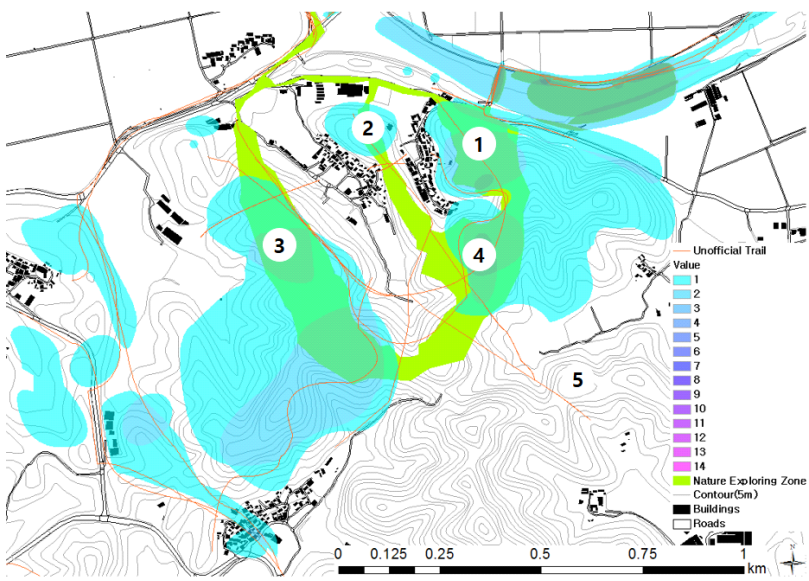
Numerous attractions within sub-divison H were identified through resident participated cognitive mapping. Sub-division H has a great accessibility to both Soya village and the wetland which means that the area has been traveled by residents of Soya village many times in the past since Upo wetland had provided diverse resources for surrounding communities for centuries. Three attractions were found which are habitats of hawk communities as indicated by point 1, perspective view point of Upo and Sajipo wetland as indicated by point 2 and lines of mulberry trees as indicated by point 3 in [Figure 4-10]



[Figure 4-10] Area with attraction perceived by residents in sub-division H

Numerous attractions within sub-division I were identified with an application of cognitive map. Sub-division I is formed around Hyojung Village which in a unique form as the one whole village was located separatedly in two separating ravine as

shown in [Fgire 4-9]. Therefore the village is surrounded by mountainous forest and varieties of unique cultural activities have passed along from generation to generation. Due to its unique landscape form there are ancient trail along the mountain ranges. Furthermore, with cognitive map it was possible to see how the trail engages diverse attractions including view point of Hwawang mountain(757.7m) indicated as 1, first sheaf burning point among whole community indicated as 2, acorn forest indicated as 3, habitats of hawk community indicated as 4 in [Figure 4-10].



[Figure 4-11] Area with attraction perceived by residents within in sub-division I

The trail was once frequently used by the residents of Hyojung village for centuries since the village is divided by the mountain range sticking which is indicated as point 2 in [Figure 4-11]. Despite its great landscape form the trail to explore the mountain range is only exposed to the villagers for leisure since all the visitors are attracted by Upo wetland. Such unique form of the landscape could

disperse concentrated number of visitors in Upo wetland by engaging villagers with visitors who has never visited this sub-division. The villager can guide the visitors to the point mentioned above, and provide different kind of services in the village for making profit.

4.3. Present Plan in Comparison with the Pre-existing plans for Upo wetland

4.3.1. The Difference in Approaches

Three different comprehensive plans for conservation and management of Upo wetland have been proposed in 2002, 2007 and 2011 by different national institutes. Ministry of Environment(2002) pointed increasing number of tourists, non-point source pollution released from farmland, increasing number of invasive species, indiscrete fishery business, construction of roads around the wetland as severe threatening factors to Upo wetland. To cope with such threats, Ministry of Environment(2002) proposed 'Establishment of conservation and management plan for 'Upo Ecosystem Conservation Area' with a goal to propose systematic and conservational solution while conserving and promoting effective use of the natural environment. The plan referred the concept of Biosphere Reserve(BR) to promote effective land use, management encompass the needs of society and natural environment. To establish the plan with such comprehensive concept, various field investigation and literature review related to human social environment and natural environment were conducted. Followed by assessment of existing resources based on conservational value and verifying problems. With the result derived from resource assessment wetland types were classified and evaluated which were used as fundamental concept for general planning and detailed planning.

Great amount of information including actual vegetation map, number of households, land use zoning, digital map, climate, DEM and other were used for numerous analysis over area of 8,540,000m^2. Although, most of information that was used for analysis are considered to be in physical forms which are more likely to have one-sided behavior and applicable to any sites out of the research site rather

than approaching for mutual relationship of the elements with surrounding environment.

GDI(2007) proposed master plan for conservation and restoration of Upo wetland by pointing that the wetland lacks comprehensive management and the present planing at that time is not resident oriented. In this research the geology, vegetation, hydrology and other environmental elements were analyzed in regional scale. Followed by survey about satisfaction towards the governance, current status, willingness to attend Ramsar convention on 227 residents living around Upo wetland. This research proposed such diverse zones which are site specific, environment oriented and also considered the perception of the residents which was the result derived from the survey. Although, in the process of zoning for restoration and conservation, opinions of experts to utilize the area, current land use zoning, environmental status, previous form of wetland, government property, present trail and related project for restoration, behavior of residents and case study site were carefully considered.

The planning suggested by GDI(2006) is realistic enough to be applicable to current environmental status of Upo wetland for conservation and restoration. Although, the resident participation in planning process was missed. Instead the plan is more like prepared for resident to join together which does not secure participation of residents.

Nakdong River Basin Environmental Office(2011) proposed conservation and utilization planning for Upo wetland protection area. The intentions of this plan were to promote effective management of wetland protection area, engaging attraction of Upo wetland with tourist attraction located outside of WPT and establishing comprehensive plan by linking vairous institutes involved in wetland restoration, wetland experience complex and other projects. was to prevent indiscrete damage

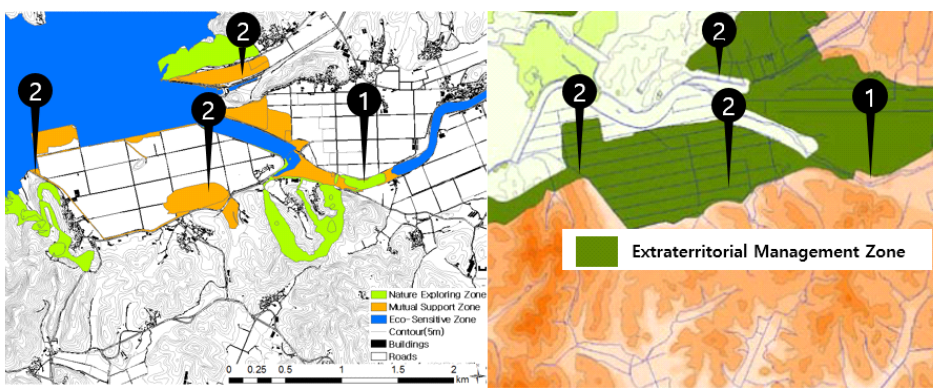
on ecologically sensitive area with proper management of wetland ecosystem, enhancement of biodiversity and improvement of environmental awareness. In this research, geographic information about water quality, flora, fauna and geography within Upo wetland are collected through literature research then analyzed. Followed by field investigation to verify current status of protection area and infrastructure then classification of the areas into utilizable area and conservable are conducted. Then ordinary citizen and experts are surveyed on land use behavior outside of protection area, awareness towards Upo wetland and evaluating previous plans. Throughout several conferences with experts and stakeholder the solution for rising problems and conservation are suggested. Furthermore, the solutions are aggregated then linked with relative institutes located outside of Upo wetland for improved participation. Such systematic approach verified specific threats along Topyeung stream and other areas.

Such comprehensive plans to link surrounding areas for conservation and efficient utilization are proposed. Furthermore, current status of ecological area and existing threats were clearly verified by field investigation as well. Although, analysis on human social environment other than except for the survey on perception towards previous and existing plans were conducted in regional scale only. Furthermore, the linking is facility based where as natural environment providing experience is considerable.

The approach of this research paper differs from three proposals above, since the previous proposals are more focused on ecological environment and inside of WPT as priorities where as this research paper proposed zoning and management plan based on areas perceived by the residents. It is obvious that there is a big difference in approaches since there is a great difference in the size of research site.

4.3.2. The Relevance of Each Plans to Livelihood of the Residents

Each plans introduced in paragraph 4.3.1 of the study have different approaches. Although, there is a great similarity among 4 plans including the plan being presented. All 4 plans aim to harmonize natural environment and human social environment together with different analyses and processes. The zoning plans suggested by all three author are based on the concept of Biosphere Reserve(BR) which consists of core, buffer and transition zone. Although, the great concept of BR was not applicable due to three reasons. First reason is that the wetland protection area of Upo wetland was not designated based on the concept of BR since people have been settled next to Upo wetland for centuries. Secondly, the construction of levee ruptured ecological connection and land use manner which is now a great threat while supporting local economy dominantly. Therefore the relevance of each zoning plans to livelihood of the residents are to be compared based on practicality.



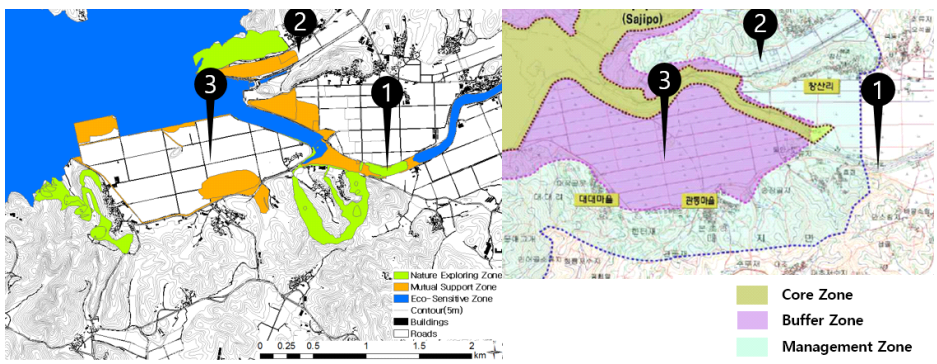
[Figure 4-12] Comparison of suggested zoning(left) to previous zoning(right)

Suggested zoning is compared to previous zoning suggested by Ministry of Environment(2002) as shown in [Figure 4-12]. Each points indicate the significant differences regarding relevance to livelihood of the residents. Firstly the zoning on

the right is designated as 'extraterritorial management zone' which is intended for constant management of point and non-point source pollution and allows construction of facilities related to ecotourism. Additionally, the livelihood of the resident need to be secured while development is restricted. As for two different zones indicated in left side of [Figure 4-12], Nature exploring zone(green) is intended for active and environmentally friendly natural and cultural experience while engaging the communities and visitors together. Mutual support zone(orange) is intended for supporting both local communities and conservation of the wetland alternatively and complete authority for managing and planning. Point 1 in [Figure 4-12] indicate the area that has been reported by numerous residents since the area and residents have been suffering from constant fishing, camping and littering which flow directly into Upo wetland and contaminate surrounding environment. Although, the area has not been designated with any zone on right side of [Figure 4-12] where as the suggesting plan designated the area as nature exploring zone and mutual support zone for constant management and wise use of the area for gaining profit from the visitors. Point 2 in [Figure 4-12] is the dysfunctional plot for cultivating main cash crop. Furthermore, point 2 is the area where waste water from villages flow directly into Upo wetland. Therefore, mutual support zone is designated for planting water purifying plants or alternative native cash crop where as the area is designated as just extraterritorial management zone.

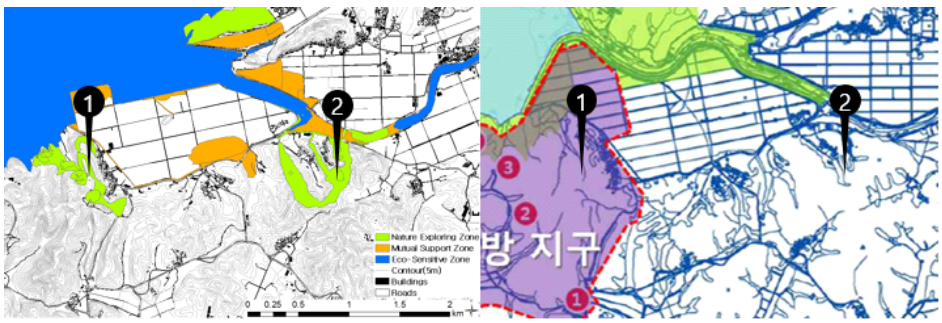
Suggested zoning is compared with the zoning proposed by GDI(2007). There were 3 significant differences regarding relevancy to livelihood of the residents as shown in [Figure 4-13]. Point 1 in [Figure 4-13] is also excluded for zoning. It may be a reason why point 1 has been exposed to severe contamination. Point 2 is a farmland that is functioning which gives enough yield for living and previous zoning on a right side of [Figure 4-13] indicate that 2 is considered to be a management

zone which supports organic farming. Although, throughout the interview with residents organic farming is not worth it in the field that gives enough yield because organic farming is too much time and energy consuming.



[Figure 4-13] Comparison of suggested zoning(left) to previous zoning(right)

Therefore organic farming should be promoted for the private farmland included in wetland protection area or mutual support zone where the field does not give enough yield. Point 3 is the plot with one of the greatest condition to cultivate onion and garlic and once the plot is designated as buffer zone which is intended for alleviating disturbance in other words very limited human activity is allowed in buffer zone. CDI(2007) took the consideration of the perception of residents by conducting a survey. Although with out verifying perception towards specific area, it is difficult to have a mutual relation with the residents.



[Figure 4-14] Comparison of suggested zoning(left) to previous zoning(right)

Nakdong River Basin Environmental Office(2011) designated point 1 as education and exploring zone which engages local communities and the plan being suggested by author also has a same intention. Although, despite that area pointed by point 2 is approved to have a great attractions through cognitive mapping the area is not designated with any zone. Where as suggested plan designated the zone as nature exploring zone. This indicate that previous zoning was done based on infrastructure rather than existing natural and cultural resources.

Overall 3 different zonings have been compared to suggested zoning and it was found that suggested zoning provides more opportunity for residents to participate in various ecotourism activities and alleviates complaints as no pressure is given to farmland with great productivity.

Chapter 5: Conclusion

1. Summary

Today, great efforts have been made in diverse fields of study for harmonizing natural environment and human social environment. In 1990s ecotourism was first introduced to Korea as one of alternatives for mass tourism to minimize environmental effect by promoting wise use of natural, cultural, historical and regional environment with active participation of local residents which contribute to local economy, culture and natural environment. Under the Natural Environment Conservation Act. Article number 41, there are total 20 ecotourism destinations designated by Ministry of Environment. Although, there have been raising issues regarding degradation of the natural environment, and raising complaints from residents of designated areas due to unilateral conservation activities and complexity of overlapping land use zonings. Regarding such phenomena, considerable amount of researches have been proposed which concluded that residents should participate in planning and managing processes for ecotourism and comprehensive management for current land use zoning is desperately needed. The participation of local residents allow flexible management of the site in relevant to the status of local economy and natural environment. Therefore, active participation of local resident is one of key factors to activate sustainable ecotourism.

This research paper employs cognitive mapping method to activate resident participation in process of verifying attractive, vulnerable and supportive areas for planning sustainable ecotourism for communities located among the most sensitive part of Upo wetland which is known to be upper Topyeung stream. Prior to conducting a cognitive mapping 41 villagers residing around Upo wetlands were interviewed and major issues of Upo wetland communities were collected. Regarding

issues 29 mapping items were constructed based on conceptual pillars of ecotourism proposed by TIES and 21 principles of ecotourism suggested by reputable researchers. Cognitive mapping with 19 residents from Daedae, Kwandong, Hyojung and Soya villages resulted in verifying specific areas where participants had strong place attachments. Areas derived from cognitive mapping were overlapped with current land use zoning for designating comprehensive zonations of sustainable ecotourism which resulted in designating 'Eco-sensitive zone', 'Nature exploring zone' and 'Mutual support zone'. As for each zones management and programs based on interview contents and cognitive map were suggested. This ecotourism plan was compared with other 3 pre-existing plans to examine the relevance of each plan to livelihood of the residents. It was found that resident participated ecotourism plan had the greatest relevance to the livelihood of the residents as the programs and zonings were site specific.

Overall, cognitive map revives the villagers to find resources in nature. With areas verified by residents in planning process, it was possible to avoid unnecessary zonings and reinforce the strength of the specific areas. Furthermore, by understanding strength and weakness of each area in detail it was possible to set zones to be mutually related to each other and surrounding environment as well. In fact, it is clear that the more number of participants the more realistic and sustainable plan will be.

2. Limitations and Expectations

This research paper has numerous limitations. First, this ecotourism plan is established with supports of residents only and none of ecological data were considered. Therefore with geographic vegetation data the quality of the results could have been a lot more realistic. Second, only 4 to 5 residents from each villages participated which could have been a lot more precise and clear if there were more participants. Third, the plans have not been approved by the residents yet. Fourth, the majority of the participants had difficulties reading geographical information. Lastly, off line mapping is time consuming especially in rural area therefore online mapping is recommendable if the participants understand.

Nonetheless, other areas should establish more participation of local residents for improved operating management plan. Government ministry, local government, and other related organizations need to pursue sustainable ecotourism with local residents. People in rural area are not familiar with cell phone and with high expectation, it is anticipated that ecotourism provides both conservation of nature and regional economy activities.

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[Appendix]

▏Appendix 1 : Survey form for Cognitive mapping

「지역주민의 참여를 통한 우포늪 공간 인식 조사」

본 조사는 서울대학교 환경대학원 환경조경학과 석사과정 논문 「지속가능한 생태관광을 위한 지역커뮤니티 이해관계 분석」의 기반이 되는 자료를 구축하는 목적을 가지고 있습니다. 우포늪의 지속가능한 보전과 관리 그리고 지역사회의 이해관계를 파악하는데 사용됩니다. 수집한 정보는 연구 목적 외에는 공개되지 않습니다. 참여해 주셔서 감사합니다.

지도교수 손용훈

서울대학교 환경대학원 환경조경학과 석사과정 전배석

PART 1. 통계처리를 위한 일반사항입니다.

(날짜:2016. . ,이름: , 연락처: ,마을:)

1	성별	① 여성 ② 남성
2	연령	① 10대 ② 20대 ③ 30대 ④ 40대 ⑤ 50대 ⑥ 60대 ⑦ 70대 ⑧ 80대 이상
3	거주기간	① 1년 미만 ② 1-5년 미만 ③ 5-10년 미만 ④ 10-15년 미만 ⑤ 15-20년 미만 ⑥ 20년 이상
4	원주민 여부	① 마을에서 태어나서 현재까지 거주 ② 마을에서 태어나서 외지생활 후 귀촌(시기: 년도:) ③ 타지에서 태어나서 귀촌(고향 : 년도:)
5	마을단체 소속여부	① 예 ② 아니요
6	소속 단체이름	( ) ex-노인회, 청년회 등
7	마을활동 참여정도	① 1번 미만/일주일 ② 1-2번 미만/일주일 ③ 2번 이상/일주일 ④ 기타 ( )
8	직업	① 농업 ② 자영업(우포늪 내) ③ 회사원(지역:) ④ 주부 ⑤ 축산업 ⑥기타 ( )
9	거주지	① 집 위치: 도면에 표시

PART2. 공간에 대한 인식 조사(도면위에 항목별로 숫자를 표시해 주세요)

1. 긍정

1) 숲길, 옛길(걷기 좋은 길, 산책로)(과거/현재)는?<선>

2) 흥미로운 동물(수달/담비/큰기러기/저어새/독수리/고니) 혹은 식물(버드나무/가시연/자라풀/사초/갈대군락)을 관찰 할 수 있는 공간은? <면>

3) 옛 추억이 있거나 아름다운 모습을 볼 수 있는 공간은?<점> 경관 대상 표시

4) 식용이 가능한 식물들(도토리나무, 오디나무, 밤나무, 다래, 약초 등)이 위치한 공간은? <면>(종 표시, 현재 접근성)

5) 수위가 급상승하여 특이한 모습을 볼 수 있는 공간은?<면> 시기 표시

6) 하천을 가까이서 바라보고 느낄 수 있는 공간은?<면>

2. 부정

7) 맷돼지가 주로 출몰하는 길은?<점, 선>

8) 길에 문제가 되거나 위험한 곳은?(낚시꾼,쓰레기,도로훼손,침수,절벽,낙석 등)<면>

9) 냄새가 올라오거나 오폐수처리 및 청소가 필요한 공간은?<면>

10) 식물이나 쓰레기가 축척되어 하천의 흐름이 원활하지 않은 공간은?<선> 시기 표시

11) 낚시꾼들이 주로 출몰하거나 환경을 더럽히는 공간은?(점, 시기, 이유)

12) 우포늪/하천이 오염된 모습을 느낄 수 있는 공간은?(원인)

3. 생활생업

13) 농업용수 확보에 문제가 있는 밭은?<면>시기 표시

14) 퇴비를 주로 쌓아두는 곳은?(시기, 위치)

15) 일년에 이용되는 제초제, 살충제 그리고 퇴비 양은?(용량/평, 상표)

종류	용량	면적	상표 및 제품명
제초제(적다1-2-3-4-5많다)			
살충제(적다1-2-3-4-5많다)			
퇴비(적다1-2-3-4-5많다)			

16) 수확량이 적거나 배수가 불량하거나 관리가 어려운 경작지는?<면>배수/수확량부족 표시

17) 제초제가 많이 필요하거나 잡초가 잘 자라는 경작지는?<면>

18) 휴경농지의 위치는?

19) 이모작이 아닌 다른 작물이 경작되는 곳은?

20) 농업용수로와 배수로는?

21) 토평천/우포늪으로 배수되는 곳은?<면>폐수처리시설 여부는?

22) 이용에 문제가 있는 농업용수로는?<선>

23) 이용이 불편한 농로는?<선>

24) 주로 이용하는 농로는?

25) 방문객과 상충이 발생하는 농로는?<선>

26) 가축의 수는?<소, 닭, 돼지>

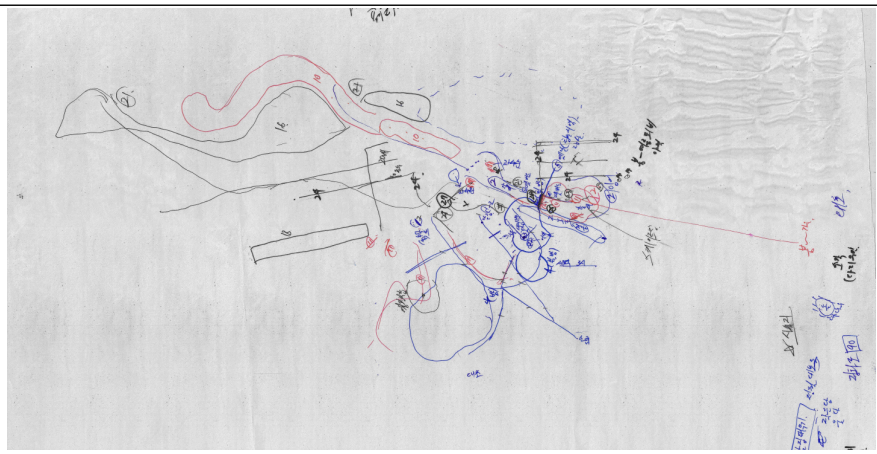
27) 생활용수/폐수가 빠져나가는 수로는?<선>(오폐수 처리 유무)

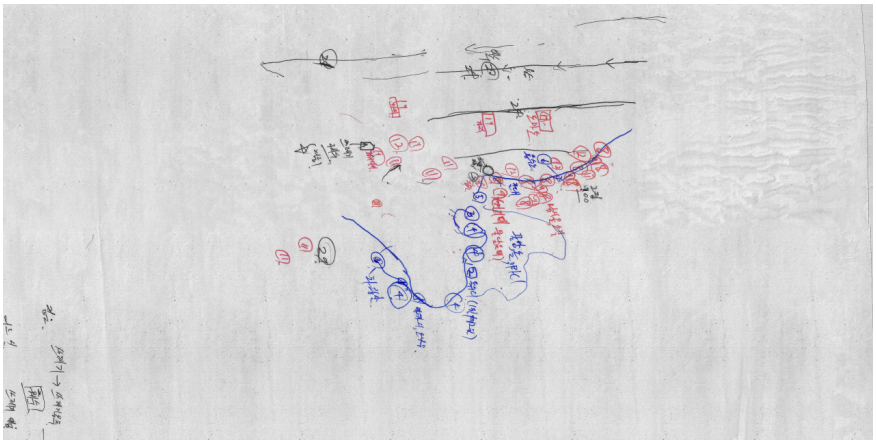
28) 쓰레기를 불가피하게 소각하는 장소는?(장소, 이유)

29) 4개의 마을 중 방문객이 유치될 건물이 들어왔으면 하는 위치는?

참여해주셔서 감사합니다.

Appendix 2 : Drawings of Residents





▌국 문 초 록

지속가능한 생태관광을 위한 지역커뮤니티 이해관계 분석
- 우포늪 습지보호지역 주변 마을을 대상으로-

서울대학교 환경대학원 환경조경학과 전 배 석
지도교수 손 용 훈

오늘날 생태관광은 환경영향을 최소화하는 동시에 지역주민의 참여로 지역의 문화 및 역사 환경과 자연 환경을 현명하게 이용하는 관광이다. 또한, 기존부터 이루어진 대중관광의 대안으로써 도입되었으나, 대부분의 생태관광지는 하양식 정책(Top-Down)과 지속적인 지역주민과의 갈등으로 인해 효과적으로 운영 및 관리가 되고 있지 않고 있다고 판단된다.

환경부는 2013년까지 총 20개소의 생태관광지를 지정하였으나, 현재까지 지정된 생태관광지는 이미 자연환경이 훼손되었거나 앞으로 훼손 가능성이 있을 뿐만 아니라 지역주민의 끊임없는 민원제기 등으로 인하여 지속가능하게 관리되고 있지 않는 실정이다. 또한, 그 동안 지속가능한 생태관광에 대해 이루어진 여러 분야의 연구들에 의하면 지역주민의 참여가 결여되어 있음을 지적하였고, 각 지역에 대한 운영 및 관리계획 수립과 운영관리에 있어 지역주민의 참여가 필요하다고 시사하고 있다.

경상남도 창녕군의 우포늪은 습지보호지역, 람사르 습지 등 여러 보호지역으로 지정된 우리나라의 10대 생태관광지 중 하나이다. 하지만, 뛰어난 생태적 가치가 입증되었음에도 불구하고, 그 동안 우포늪 생태관광 계획들은 습지의 보전에만 초점을 맞춘 습지보전법 등 강한 규제로 인하여 지역주민과의 갈등을 빚고 있는 것이 현실이다. 이에 따라 우포늪의 지속가능한 생태관광 계획을 수립하는 과정에 있어 지역주민의 참여가 절실히 요구되는 시점이다.

본 연구는 우포늪 인근 지역주민의 참여를 기반으로 우포늪의 지속가능한

생태관광을 위한 용도지역을 재구성하는 것을 목적으로 한다. 또한, 우포늪으로 유입되는 토평천 상류지역의 대대, 관동, 효정 그리고 소야 마을을 대상지로 설정하여, 습지와 마을이 인접한 생태관광지로써 우포늪의 통합적인 운영과 지속가능한 관리를 위한 공간계획을 수립하는데 있다.

본 연구의 방법은 크게 두 단계로 나뉜다. 우선, 대상지에 거주하는 지역주민의 인식을 도면화(Mapping)를 한 후, 통합하여 인지지도(Cognitive Mapping)를 도출하여 지역주민이 느끼는 지역의 환경을 분석하였다. 이 과정에서 지역주민과의 사전 개방형 인터뷰를 통해 인지지도의 항목을 설정하였고, 도출된 항목으로 도면화를 진행하였다. 다음으로는 주민들의 인지지도와 기존의 용도지역을 비교하여 우포늪의 지속가능한 생태관광을 위한 용도지역을 재구성하였고, 각 용도지역에 대해 지역주민 인터뷰를 토대로 생태관광 프로그램을 제안하였다. 도면화 작업과 용도지역 재구성 과정에서는 지리정보시스템(ARC GIS 10.1)을 활용하였다.

본 연구에서는 인지지도를 활용하여 재구성한 용도지역과 기존의 용도지역을 비교분석 하였으며, 그 결과로 지역주민의 참여가 용도지역 재구성 과정에서 높은 영향을 끼쳤음을 알 수 있었다. 이에 대한 내용은 다음과 같다.

1. 보다 현실적인 지역경제활동과 자연환경보전의 균형
2. 구체적인 환경훼손의 원인 및 개선 요인 파악
3. 지역주민의 자발적 참여를 통한 생태관광자원 및 잠재자원 발굴
4. 지역주민의 프로그램 참여 활동 의지 증진

본 연구에서는 우포늪의 지속가능한 생태관광을 위해 지역주민의 참여가 가져오는 효과를 인지지도를 활용하여 살펴보았다. 결과에서 알 수 있듯이 지역주민과 함께 하는 생태관광이 보다 더 현실적임을 판단할 수 있었다. 또한, 다른 지역에도 지역주민의 참여를 통해 보다 해당 지역 실정에 맞는 보다 현실적인 운영관리계획이 수립되어야 할 것이며, 정부부처, 지자체 그리고 관련단체들은

지역주민과 함께 지속가능한 생태관광을 위해 힘써야 할 것이다. 생태관광이 각 지역의 자연환경 보전과 동시에 지역경제활동에 이바지 하는 우수 모델로 역할을 할 수 있도록 기대한다.

주요어 : 공간인지, 공간인식, 주민참여, 현명한 이용, 용도지역지구, 습지보호지역, 우포늪, 생태관광, 토평천

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